



AGRICULTURAL RESEARCH INSTITUTE

PUSA

THE
ENTOMOLOGIST

An Illustrated Journal

OF

GENERAL ENTOMOLOGY.

EDITED BY N. D. RILEY, F.R.E.S., F.Z.S.,

WITH THE ASSISTANCE OF

ROBERT ADKIN, F.R.E.S.

H. ELTRINGHAM, M.A., D.Sc.,

F.R.S., F.R.E.S., F.Z.S.

F.W. FROHAWK, F.R.E.S., M.B.O.U.

C. J. GAHAN, D.Sc., M.A., F.R.E.S.

J. W. HESLOP HARRISON,

D.Sc., F.R.S.

CAPT. A. F. HEMMING,

C.B.E., F.R.E.S.

CLAUDE MORLEY,

F.R.E.S., F.Z.S., F.G.S.

W. G. SHELDON, F.R.E.S., F.Z.S.

“By mutual confidence and mutual aid
Great deeds are done and great discoveries made.”

VOLUME THE SIXTY-NINTH

LONDON:

ADLARD & SON, LIMITED,

21, HART STREET, BLOOMSBURY SQUARE, W.C. 1

—
1936

PRINTED BY ADLARD AND SON, LIMITED,
21, HART STREET, W.C. 1.

Made and printed in Great Britain.

LIST OF CONTRIBUTORS.

- ABBOTT, CHAS. R., 69
 BALLINGER, DENNIS E., 131
 BAYNES, E. S. A., F.R.E.S., 45
 BEIRNE, BRYAN, 80
 BENSON, ROBERT B., M.A., F.R.E.S., 148
 BRETHERTON, R. F., 241
 BRETT, G. A., 14, 263
 BUCKLEY, A. W., 44
 BUCKSTONE, A. A. W., 15, 253, 262
 BULL, G. V., 230, 266
 BURKILL, H. J., M.A., F.R.G.S., 85
 BUSBRIDGE, W. E., 69, 94, 199
 BUXTON, Prof. P. A., M.A., F.R.E.S., 171
 CAMPBELL, J. L., 266
 CAMPBELL-TAYLOR, J. E., F.R.E.S., 18, 46
 CAPENER, A. L., 94
 CHARTRES, S. A., 244, 254, 266
 CHIPPERFIELD, H. E., 156
 CLASSEY, E. W., 186
 COCKAYNE, E. A., M.A., M.D., F.R.C.P., F.R.E.S., 245
 COCKERELL, Prof. T. D. A., 17, 37, 156, 291
 COLLENETTE, C. L., F.R.E.S., 178, 230
 COOKE, Brig-Gen. B. H., C.M.G., C.B.E., D.S.O., F.R.E.S., 264
 COOPER, B. A., 241, 242
 COWLEY, J., M.A., F.R.E.S., 149
 CRABTREE, B. H., 152
 DALTRY, H. W., F.R.E.S., 114
 DANNREUTHER, Capt. T., R.N., 1, 12, 63, 14, 182, 225, 255, 282
 DAVIS, MERVYN J. L., 177, 292
 DE WORMS, C. G. M., M.A., F.R.E.S., 104, 132, 157
 DONISTHORPE, H. StJ. K., F.R.E.S., 108
 DONOVAN, Lt.-Col. C., 53, 265, 290
 DOWDESWELL, W. H., 49
 DRYSDALE, Major J. E., 230
 EDELSTEN, H. M., F.R.E.S., 15, 16, 124, 131, 177, 223, 240
 EDWARDS, F. W., D.Sc., F.R.E.S., 192, 196, 218, 219, 220, 243, 292
 ELLIS, H. WILLOUGHBY, F.R.E.S., 76, 100, 172, 195, 268
 FINNIGAN, W. J., 69
 FLETCHER, Fleet-Paymaster T. BAINBRIDGE, R.N., F.L.S., F.Z.S., F.R.E.S., 60, 70, 192, 238, 273
 FRAMPTON, R. E. E., 217
 FRAZER, J. F. D., 222
 FROHAWK, F. W., M.B.O.U., F.R.E.S., 14, 43, 63, 111, 119, 252, 263
 FRYER, J. C. F., M.A., O.B.E., F.R.E.S., 223, 269
 GABRIEL, A. G., F.R.E.S., 281
 GANE, C. W. V., 53, 186, 192
 GARRATT, J. C., 15
 GAUNT, DAVID, 266
 GILLES, W. S., F.I.C., F.C.S., F.R.E.S., 215
 GILLMAN, Rev. J. G., 18
 GOLDSMITH, E. T., 218
 GRANT, Mrs. K. J., F.R.E.S., 125
 GREER, THOMAS, 290
 GREGSON, Col. G. K., D.S.O., F.R.E.S., 263
 HALL, ARTHUR, F.R.E.S., 274
 HARRISON, G. HESLOP, D.Sc., 60, 72, 175
 HIGGINS, L. G., M.A., F.R.C.S., F.R.E.S., 146
 HINCHLIFFE, Miss K. M., 252
 HINTON, H. E., B.Sc., F.R.E.S., 164, 283
 HODGE, HAROLD, F.R.E.S., 273
 HODGSON, G. B., 17
 HODSON, E. V., 291
 HUGGINS, H. C., 17
 HUGHES, A. W., 107
 HULL, Rev. J. E., D.Sc., 217
 HUTCHINSON, C. H., 44
 JACKSON, JEFFERY, 38
 JAMES, RUSSELL, 271
 JOHNSON, E. E., 31, 33
 KAYE, W. J., F.R.E.S., 24
 KEIR, W., B.Sc., 25
 KING, E. M. BOLTON, 263
 KING, HAROLD, D.Sc., F.R.S., 114, 143
 KIMMINS, D. E., 147, 279
 KNOWLES, I. D. W., 192
 LABOUCHERE, Col. F. A., F.R.E.S., 181
 LAING, F., M.A., F.R.E.S., 22, 170
 LENNEY, FRANK, 131
 LEWIS, E. S., 216
 MCKENNY-HUGHES, A. W., D.I.C., 48, 75, 100
 MACLEOD, H. G., 43, 45
 MANLEY, Capt. W. B. L., 224
 MILMAN, P. P., 94
 MOLLISON, D. M., 159
 MORLEY, CLAUDE, F.G.S., F.Z.S., F.R.E.S., 39, 64, 90, 115, 140, 161, 187, 209, 292
 MORRIS, STANLEY, 238

- MOSELY, MARTIN E., F.R.E.S., 13, 63, 87, 120
 MURRAY, JAS., 19, 96, 266
 NEWMAN, L. W., F.R.E.S., 215
 NICHOLSON, C., 15, 181
 NIXON, G. E. J., B.A., 21
 OLIVER, G. B., 34, 263
 PEAKE, A. M., 231
 PELLE, Lt.-Col. H. D., F.R.E.S., 181, 217
 PENNINGTON, F., 94
 PIERCE, F. N., 242
 PITMAN, C. R. M., 169
 PRIDEAUX, R. M., 218
 RAIT-SMITH, W., F.R.E.S., 123
 RICHARDS, A. W., 42, 44
 RILEY, N. D., F.R.E.S., F.Z.S., 43, 55, 68, 70, 73, 84, 86, 97, 124, 139, 143, 169, 174, 186, 192, 193, 222, 240, 242
 RIPPON, C., M.A., 278
 RUSSELL, G. M., 45
 RUSSELL, S. G. CASTLE, 77, 173, 222
 RUTHERFORD, C. J., 70
 SCHWANWITSCH, Prof. B. N., 7
 SCOTT, Rt. Hon. Lord Justice, 168
 SHELDON, W. G., F.R.E.S., 111, 200, 209, 240, 260
 SHEPHERD, J., 61
 SMITH, P. SIVITER, 24, 76, 100
 SMYTH, T. R. H., 169
 STRINGER, H., 144
 TALBOT, G., F.R.E.S., 56, 112
 TAMS, W. H. T., F.R.E.S., 160
 TATHAM, C. J., 43
 THOMAS, P. HAIG, 101, 136
 TIDMAN, DENYS A., 224
 TOMLIN, J. R. LeB., M.A., 208
 TULLOCH, Brig.-Gen. J. B. G., C.B., C.M.G., 6, 54, 143, 191, 242
 TURNER, A. H., 254
 TURNER, H. J., F.R.E.S., 24, 48, 124, 148, 172, 194, 220, 244, 267
 VINALL, H. J., 16
 WADSWORTH, R. V., 159
 WAKELY, S., 32, 197
 WATTISON, J. T., 16
 WELTH, ARTHUR, F.R.E.S., 36
 WESTROPP, M. S. D., 12
 WHELLAN, J. A., 131, 215, 216
 WHITCOMBE, E. P., 230
 WILD, E. H., 168
 WILKINSON, D. S., F.R.E.S., 81
 WILTSHIRE, E. P., 239
 WOOD, Capt. J. O. N., R.N., 230
 WRIGHT, A. E., F.R.E.S., 46, 95, 242
 WYNN, G. W., 290

ILLUSTRATIONS.

I and II. Mechanism of the Saw-fly terebrae	To face p. 30
III. <i>Danaus dannatti</i> sp. nov.	112
IV. Some varieties of British Lepidoptera	221
V. <i>Lampropteryx otregiata</i> Metcalfe	252
VI. <i>Hyponomeuta rorellus</i> Hübner	269

TEXT-FIGURES.

	PAGE
1. <i>Hypermenestra helios</i> Men. Underside of hind wing	9
2. <i>Sericinus telamon</i> Don. Underside of hind wing	9
3. <i>Thais cerysii</i> God. Underside of hind wing	10
4. <i>Apanteles analis</i> Nees	93
5. Head of <i>Acropyga robæ</i>	109
6. Analysis of flights of <i>Vanessa atalanta</i>	127
7. Distribution of <i>V. atalanta</i> in the British Isles	128
8. <i>Pachypasa madelineæ</i> sp. nov.	160
9. <i>Dryopomorphus extraneus</i> Hinton. Antenna, etc.	166
10. <i>Paraproctis calamolopha</i> Collenette sp. nov.	179
11. Cocoons of <i>Hemerophila abruptaria</i> Thunb.	253
12. <i>Rhithrogena semicolorata</i> Curtis ♂	279
13. <i>Rhithrogena semitincta</i> Pictet ♂	280
14. <i>Elsianus salti</i> Hinton	283
15. Male genitalia of <i>Elsianus salti</i> Hinton	284
16. Middle tibia of <i>Heterelmis pubipes</i> Hinton	286
17. <i>Heterelmis pubipes</i> Hinton. Elytron, etc.	287

CONTENTS.

Migration Records, 1935, *Capt. T. Dannreuther, R.N.*, 1. Symmetry in the Wing-pattern of Some Papilionid Butterflies, *B. N. Schranzkech*, 7. A New Kashmir Caddis Fly (Trichoptera), *Martin E. Mosely, F.R.E.S.*, 13.

NOTES AND OBSERVATIONS.—Late Appearance of *P. brassicae* larva, *B. Tulloch (Brig.-Gen.)*, 6. *Mania maura* in Sand Martin's Nests, *M. S. D. Westropp*, 12. *Plusia gamma* at Hastings, *T. Dannreuther (Capt.)*, 12. *Sphinx convolvuli* in Sussex, *G. A. Brett*, 14. *Gonepteryx rhamni* in November, *F. W. Frohawk*, 14. *Thecla quercus* Congregating at Hawthorn, *A. A. W. Buckstone*, 14. *Macroglossum stellatarum* in October, *H. M. Edelsten*, 15. *Hippotion celerio* in Surrey, *J. C. Garratt*, 15. *Arotia caia* in the Autumn in Cornwall and Devon, *C. Nicholson*, 15. Swarming of *Thaumetopoea pityocampa* (Lep.), *J. T. Wattison*, 15. *Agrotis cinerea* Occurring Inland, *Hugh J. Vinall*, 16. *Loxostege palealis*, *H. M. Edelsten*, 16. Unusual Food-plant of *Sesia cynipiformis*, *H. C. Huggins*, 16. Lepidoptera in West Cornwall, *S. B. Hodgson*, 17. *Trigona* in the Caroline Islands, *T. D. A. Cockerell*, 17. Odonata in Kent, *J. G. Gillman*, 17. An Unusual Nest of a Leaf-cutter Bee, *J. E. Campbell-Taylor*, 18. Diptera in Dumfriesshire, *Jas. Murray*, 18.

RECENT LITERATURE, 20.

SOCIETIES.—South London Entomological Society, 22. Entomological Club, 24. Entomological Section, Birmingham Natural History and Philosophical Society, 24.

STEVENS'S AUCTION ROOMS Ltd.

Will Sell on 15th February the Collection of British Lepidoptera formed by the late Dr. W. Gifford Nash, of Bedford. Many good vars. of *Coridon*; *Gynandromorph Paphia*, male left side, *Valezina* right side; *Hyperanthus lanceolata*, upper side; fine striated *Icarus* and *obsoleta* forms, and many others; Grand Black *S. pinastri*. Long series *L. arion* and other Butterflies. *Z. trifolii* (3), all red confluent; *Macularia*, fine banded. Four Cabinets and a quantity of Store-boxes with duplicates, and some books. On view day before Sale and morning of Sale; also the Collection may be seen privately any day or time by appointment during January at the Offices of L. W. NEWMAN, BEXLEY, KENT (Phone: Bexleyheath 286.) Catalogues ready end of January from

STEVENS'S AUCTION ROOMS LTD.
38, King Street, Covent Garden, W.C. 2.

W. F. H. ROSENBERG

Telephone:
PRIMROSE 0440.

57, HAVERSTOCK HILL, LONDON, N.W. 3.

GRATIS AND POST FREE—

Price List No. 31. Lepidoptera of the World


(Low prices and many cheap lots.)

**Also Special Supplementary List of Duplicates from
the Oberthur Collection.**

including scarce species from Tibet and other desirable localities.

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

 NOTICES OF EXCHANGE should be received by the 21ST OF EACH MONTH to insure insertion.

Ova for photographic purposes.—I still require the loan of many species of ova of British Lepidoptera, some of them quite common ones, and shall be happy to forward a desiderata list to anyone who will help me to obtain them.—*Alfred E. Tonge, "Aincroft," Reigate.*

NOW READY.

LABEL AND EXCHANGE LISTS OF British Neuroptera, Paraneuroptera, Orthoptera, Trichoptera, Ephemeroptera, Plecoptera.

To be obtained from ADLARD & SON, Ltd., 21, Hart Street, W.C.1.

Prices for each List: 3d. single copies, 1/- for six, post free.

W. H. JANSON & SON

Insect Cabinets, first-class make, polished as mahogany, dustproof framed covers to drawers, with mahogany glass-panel door; special hard-wood plinth to stand wear; 12 drawers, size 17" × 15" × 2" Price £8 15s.

Microslide Cabinets, polished pine, 28 drawers holding 1008 slides, with glass-panel door Price £5 5s.

Cabinets, Storeboxes, etc. are our own best make.

MOLL—a New Superfine Material for Lining Cabinets and Storeboxes, far superior to Peat or Cork. Samples sent free.

We are Sole Agents in Great Britain for Moll.

In response to numerous inquiries for a reliable preparation for the destruction of the "Death Watch Beetle" and other wood-borers, we are stocking "CUPRINOL" in ½-pint tins, price 2/6, post. extra 5d.

Relaxing Box, superior aluminium finish, size 7" × 5" × 2", ready for use, will last for several months, price 2/9, post. 6d. Fluid for re-charging 4d., post. 3d.

Price List sent free.

P.O. Box 128, 44, Gt. Russell Street,

Phone: MUSEum 1267.

LONDON, W.C.1

CONTENTS.

The Mechanism and Manner of Action of the Saw-fly Terebrus, *W. Keir, B.Sc.*, 35. Lepidoptera at Norwood, *S. Waksley*, 32. What is Aberrational Influence?, *G. B. Oliver*, 34. Some African Osmiine Bees, *T. D. A. Cockerell*, 37. Notes on Braconidae. XV.—Microgasterinae, *Glenda Morley, F.E.S.*, *F.G.S.*, *F.Z.S.*, 39.

NOTES AND OBSERVATIONS.—*Strymon w-album* Attracted to Cow Parsnip, *E. E. Johnson*, 31. *Limenitis camilla* alb. nigritina, *E. E. Johnson*, 33. *Danaus chrysippus* at Sea, *Arthur Wallis*, 36. *Colias croceus* in the Isle of Man, *Jeffrey Jackson*, 38. *Nymphalis antiopa* in Derbyshire, *A. W. Richards*, 42. *Danaus plexippus* at Bexhill, *H. G. Macleod*, 43. *Gonepteryx rhamni* in December, *C. J. Tatham*, 43. *Gonepteryx rhamni* in November, *F. W. Frohawk*, 43. *Vanessa cardui* at Sea, *N. D. Riley*, 43. *Maniola jurtina* (Linn.) in N.E. Derbyshire, *A. W. Richards*, 43. *Acherontia atropos* at Skeimanshorpe, *W. Buckley*, 44. *Deiopeia pulchella* and *Argynnis lathonia*, etc. at Eastbourne, *C. H. Hutchinson*, 44. An Unusually late Brood of *Pieris brassicae* Larvae, *G. M. Russell*, 44. *Campealis nupta* ab. *brunnescens*, *H. S. Atkinson, F.R.E.S.*, 45. *Fluga gamma* Observations at Hastings, *H. G. Macleod*, 45. *Braconatorix maritima* St. Jor. Brood, *Albert E. Wright, F.R.E.S.*, 45. Is *Gerris naja* Single or Double-headed?, *J. E. Campbell-Taylor, F.R.E.S.*, 46.

SOCIETIES.—Royal Entomological Society of London, 47. South London Entomological Society, 48.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest stations, South Kensington and Gloucester Road).—Wednesday, February 24, 1936. The Library is open daily 10 a.m. to 6 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays, to 10 p.m. meeting nights; closed during September. Hon. Sec. A. W. McCleave Higgins.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, HILTONIA Chambers, London Bridge, S.E. 1. Meetings second and fourth Thursday of every month at 7 p.m.—Hon. Sec. S. J. K. N. A. Jacobs. Chairman, Bayes Lane, Bromley, Kent.

LONDON MEDICAL HISTORY SOCIETY.—Meetings first from Tuesday in the month at 6.30 p.m. at the London School of Hygiene and Tropical Medicine, Keppel Street, London, W.C. 1. Visitors admitted on request. What may be obtained through Members from the Hon. Sec. A. E. Williams, 20, St. John's Road, Dalmeida Hill, Essex.

THE SOCIETY FOR GENERAL ENTOMOLOGY, 22, CARTER OAKS, Southampton. Meetings—September to April—second Saturday in each month at 8 p.m. May to July, third Wednesday in each month at 7 p.m.—Hon. Sec. E. A. Worsfold, 20, St. John's Road, Dalmeida Hill, Essex.

W. F. H. ROSENBERG

67, HAVENSTON HILL, LONDON, N.W. 4

Price List No. 11, a copy of which of the above is sent on request.

Also supplied by special order, and by direct purchase from the publishers.

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

NOTICES OF EXCHANGE should be received by the 21st of each MONTH to insure insertion.

Ova for photographic purposes—I still require the loan of many species of ova of British Lepidoptera, some of them quite common ones, and shall be happy to forward a desiderata list to anyone who will help me to obtain them.—*Alfred E. Tonge, "Aincroft," Reigate.*

CHANGES OF ADDRESS—A. A. M. Batchelor, Esq., to Tangle Grove, Heron's Ghyll, near Uckfield. E. D. Bostock, Esq., to "Alconbury," Painsam Gardens, Folkestone. A. J. L. Byles, Esq., to 15 Queen's Gardens, Marine Bay, Kent. T. R. P. Haslop, Esq., to Nigerian Administrative Service, Ogburn, Warri Province, and Eastern Southern Nigeria, W. Africa. George H. Yenden, Esq., to "Greenhurst," 63 Salisbury Road, Dover.

SEITZ PALAEARCTIC LEPIDOPTERA

Wanted Supplement to Vol. I.
(Palaearctica), rebound.

W. S. CHILDS, Bocking, Braintree.

LEONARD TATCHELL, Entomologist.

SWANAGE, DORSET.

SEND FOR SPECIMENS. Published 1907.

Catalogue of the Macrolepidoptera of Ireland.

J. B. O'NEILL & DONOVAN, I.R.S. (1911).

London GPO and the London Directory Co. Ltd.

Reprinted with the permission of the Director.

ENTOMOLOGIST'S BACK NUMBERS

WANTED.

Full payment must be paid by the Publishers for the following:

1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919, 1920, 1921, 1922, 1923, 1924, 1925, 1926, 1927, 1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 2739, 2740, 2741, 2742, 2743, 2744, 2745, 2746, 2747, 2748, 2749, 2750, 2751, 2752, 2753, 2754, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2768, 2769, 2770, 2771, 2772, 2773, 2774, 2775, 2776, 2777, 2778, 2779, 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, 2789, 2790, 2791, 2792, 2793, 2794, 2795, 2796, 2797, 2798, 2799, 2800, 2801, 2802, 2803, 2804, 2805, 2806, 2807, 2808, 2809, 2810, 2811, 2812, 2813, 2814, 2815, 2816, 2817, 2818, 2819, 2820, 2821, 2822, 2823, 2824, 2825, 2826, 2827, 2828, 2829, 2830, 2831, 2832, 2833, 2834, 2835, 2836, 2837, 2838, 2839, 2840, 2841, 2842, 2843, 2844, 2845, 2846, 2847, 2848, 2849, 2850, 2851, 2852, 2853, 2854, 2855, 2856, 2857, 2858, 2859, 2860, 2861, 2862, 2863, 2864, 2865, 2866, 2867, 2868, 2869, 2870, 2871, 2872, 2873, 2874, 2875, 2876, 2877, 2878, 2879, 2880, 2881, 2882, 2883, 2884, 2885, 2886, 2887, 2888, 2889, 2890, 2891, 2892, 2893, 2894, 2895, 2896, 2897, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2919, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2931, 2932, 2933, 2934, 2935, 2936, 2937, 2938, 2939, 2940, 2941, 2942, 2943, 2944, 2945, 2946, 2947, 2948, 2949, 2950, 2951, 2952, 2953, 2954, 2955, 2956, 2957, 2958, 2959, 2960, 2961, 2962, 2963, 2964, 2965, 2966, 2967, 2968, 2969, 2970, 2971, 2972, 2973, 2974, 2975, 2976, 2977, 2978, 2979, 2980, 2981, 2982, 2983, 2984, 2985, 2986, 2987, 2988, 2989, 2990, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 2999, 3000, 3001, 3002, 3003, 3004, 3005, 3006, 3007, 3008, 3009, 3010, 3011, 3012, 3013, 3014, 3015, 3016, 3017, 3018, 3019, 3020, 3021, 3022, 3023, 3024, 3025, 3026, 3027, 3028, 3029, 3030, 3031, 3032, 3033, 3034, 3035, 3036, 3037, 3038, 3039, 3040, 3041, 3042, 3043, 3044, 3045, 3046, 3047, 3048, 3049, 3050, 3051, 3052, 3053, 3054, 3055, 3056, 3057, 3058, 3059, 3060, 3061, 3062, 3063, 3064, 3065, 3066, 3067, 3068, 3069, 3070, 3071, 3072, 3073, 3074, 3075, 3076, 3077, 3078, 3079, 3080, 3081, 3082, 3083, 3084, 3085, 3086, 3087, 3088, 3089, 3090, 3091, 3092, 3093, 3094, 3095, 3096, 3097, 3098, 3099, 3100, 3101, 3102, 3103, 3104, 3105, 3106, 3107, 3108, 3109, 3110, 3111, 3112, 3113, 3114, 3115, 3116, 3117, 3118, 3119, 3120, 3121, 3122, 3123, 3124, 3125, 3126, 3127, 3128, 3129, 3130, 3131, 3132, 3133, 3134, 3135, 3136, 3137, 3138, 3139, 3140, 3141, 3142, 3143, 3144, 3145, 3146, 3147, 3148, 3149, 3150, 3151, 3152, 3153, 3154, 3155, 3156, 3157, 3158, 3159, 3160, 3161, 3162, 3163, 3164, 3165, 3166, 3167, 3168, 3169, 3170, 3171, 3172, 3173, 3174, 3175, 3176, 3177, 3178, 3179, 3180, 3181, 3182, 3183, 3184, 3185, 3186, 3187, 3188, 3189, 3190, 3191, 3192, 3193, 3194, 3195, 3196, 3197, 3198, 3199, 3200, 3201, 3202, 3203, 3204, 3205, 3206, 3207, 3208, 3209, 3210, 3211, 3212, 3213, 3214, 3215, 3216, 3217, 3218, 3219, 3220, 3221, 3222, 3223, 3224, 3225, 3226, 3227, 3228, 3229, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3265, 3266, 3267, 3268, 3269, 3270, 3271, 3272, 3273, 3274, 3275, 3276, 3277, 3278, 3279, 3280, 3281, 3282, 3283, 3284, 3285, 3286, 3287, 3288, 3289, 3290, 3291, 3292, 3293, 3294, 3295, 3296, 3297, 3298, 3299, 3300, 3301, 3302, 3303, 3304, 3305, 3306, 3307, 3308, 3309, 3310, 3311, 3312, 3313, 3314, 3315, 3316, 3317, 3318, 3319, 3320, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344, 3345, 3346, 3347, 3348, 3349, 3350, 3351, 3352, 3353, 3354, 3355, 3356, 3357, 3358, 3359, 3360, 3361, 3362, 3363, 3364, 3365, 3366, 3367, 3368, 3369, 3370, 3371, 3372, 3373, 3374, 3375, 3376, 3377, 3378, 3379, 3380, 3381, 3382, 3383, 3384, 3385, 3386, 3387, 3388, 3389, 3390, 3391, 3392, 3393, 3394, 3395, 3396, 3397, 3398, 3399, 3400, 3401, 3402, 3403, 3404, 3405, 3406, 3407, 3408, 3409, 3410, 3411, 3412, 3413, 3414, 3415, 3416, 3417, 3418, 3419, 3420, 3421, 3422, 3423, 3424, 3425, 3426, 3427, 3428, 3429, 3430, 3431, 3432, 3433, 3434, 3435, 3436, 3437, 3438, 3439, 3440, 3441, 3442, 3443, 3444, 3445, 3446, 3447, 3448, 3449, 3450, 3451, 3452, 3453, 3454, 3455, 3456, 3457, 3458, 3459, 3460, 3461, 3462, 3463, 3464, 3465, 3466, 3467, 3468, 3469, 3470, 3471, 3472, 3473, 3474, 3475, 3476, 3477, 3478, 3479, 3480, 3481, 3482, 3483, 3484, 3485, 3486, 3487, 3488, 3489, 3490, 3491, 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501, 3502, 3503, 3504, 3505, 3506, 3507, 3508, 3509, 3510, 3511, 3512, 3513, 3514, 3515, 3516, 3517, 3518, 3519, 3520, 3521, 3522, 3523, 3524, 3525, 3526, 3527, 3528, 3529, 3530, 3531, 3532, 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547, 3548, 3549, 3550, 3551, 3552, 3553, 3554, 3555, 3556, 3557, 3558, 3559, 3560, 3561, 3562, 3563, 3564, 3565, 3566, 3567, 3568, 3569, 3570, 3571, 3572, 3573, 3574, 3575, 3576, 3577, 3578, 3579, 3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3624, 3625, 3626, 3627, 3628, 3629, 3630, 3631, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648, 3649, 3650, 3651, 3652, 3653, 3654, 3655, 3656, 3657, 3658, 3659, 3660, 3661, 3662, 3663, 3664, 3665, 3666, 3667, 3668, 3669, 3670, 3671, 3672, 3673, 3674, 3675, 3676, 3677, 3678, 3679, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 3687, 3688, 3689, 3690, 3691, 3692, 3693, 3694, 3695, 3696, 3697, 3698, 3699, 3700, 3701, 3702, 3703, 3704, 3705, 3706, 3707, 3708, 3709, 3710, 3711, 3712, 3713, 3714, 3715, 3716, 3717, 3718, 3719, 3720, 3721, 3722, 3723, 3724, 3725, 3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769, 3770, 3771

CONTENTS.

The Lepidoptera of Cara Island, *W. H. Doideswell*, 49. The Great Frost of May, 1935, and its Effects on Butterfly Life, *Brigadier-General J. B. G. Tulloch*, 54. Notes upon Some Butterflies from Siam, with Descriptions of New Races and Forms (Lep. Rhopalocera), *G. Talbot, F.R.E.S.*, 56. Yellow *Pieris napi*: A Breeding Experiment, *J. Shepherd*, 61. Notes on Braconidae. XV.—Microgasterinae, *Claude Morley, F.R.E.S., F.G.S., F.Z.S.* (continued from p. 42), 64.

NOTES AND OBSERVATIONS.—*Vanessa atalanta* Hibernating in Yorkshire, *C. W. F. Gane*, 53. *Miselia oxyacanthae* var. *Capucina*, *C. Donovan, Lt.-Col. I.M.S. (ret.)*, 53. *Pontia daphnicide* in Essex, *N. D. Riley*, 55. *Sesia myopaeformis* Feeding in *Crataegus oxyacantha*, (*Fleet-Paymaster*) *T. Bainbrigge Fletcher*, 60. *Celerio galii* Rott. in the Team Valley, North Durham, (*Dr.*) *George Heslop Harrison*, 60. Imaginal Trichoptera Apparently Feeding, *Martin E. Mosely*, 63. *Vanessa cardui* in January, (*Capt.*) *T. Dannreuther, R.N.*, 63. Late Appearance of *Pieris brassicae* Larvae, *F. W. Frohawk*, 63. Liberation of *Nymphalis antiopa* in England, *Ed.*, 67. *Gonepteryx rhamni* in November, *William E. Busbridge*, 69. *Gonepteryx rhamni* in November, *W. J. Evansgan*, 69. *Gonepteryx rhamni* in November, *Chas. R. Abbott*, 69. *Nymphalis antiopa* Hibernating in Cornwall, *C. J. Rutherford*, 69. Abnormal Pairings, *Ed.*, 70. Notes from the Hebrides, (*Dr.*) *George Heslop Harrison*, 71.

RECENT LITERATURE, 72.

SOCIETIES.—Royal Entomological Society of London, 73. Entomological Club, 75. Birmingham Natural History and Philosophical Society: Entomological Section, 76.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest stations South Kensington and Gloucester Road).—*Wednesdays, March 4th and 11th, 1935.* The Library is open daily 10 a.m. to 6 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays; to 10 p.m. meeting nights; closed during September.—*Hon. Sec.* A. W. MCKENNY HUGHES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hickmott Chambers, London Bridge, S.E. 1.—Meetings second and fourth *Thursdays* in every month at 7 p.m.—*Hon. Sec.* STANLEY N. A. JACOBS. Ditching, Hayes Lane, Bromley, Kent.

LONDON NATURAL HISTORY SOCIETY.—Meetings first four *Thursdays* in the month at 8.30 p.m. at The London School of Hygiene and Tropical Medicine, Keppel Street, Covent Street, W.C. 1. Visitors admitted by ticket, which may be obtained through Members or from the Hon. Sec., A. B. HORSBLOW, 71, Queen's Road, Parkhurst Hill, Essex.

THE SOCIETY FOR BRITISH ENTOMOLOGY, 29, Carlton Crescent, Southampton. Meetings, September to April, third Saturday in each month at 7 p.m.; May to July, third Wednesday in each month at 7 p.m.—*Hon. Sec.* E. HARRINGTON GORRA, 102, High Street, Southampton.

W. F. H. ROSENBERG

Telephone:
PRIMROSE 4442

57 HAVERSTOCK HILL, LONDON, N.W. 1

ENTOMOLOGICAL BOOKS

Price List No. 11. Lepidoptera of the World

Also Special Supplements on the East and West Palearctic Fauna

and the Holarctic and Palearctic Fauna

and the Palearctic and Palearctic Fauna

and the Palearctic and Palearctic Fauna

EXCHANGE

The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused. *Marked * are bred.*

NOTICES OF EXCHANGE should be received by the 21st of each MONTH to insure insertion.

Wanted.—Larvae of *Arctia data* in exchange for larvae of *Arctia villica* or pupae of *Dianthoea carphagae*.—S. A. Chantres, 9, King's Drive, Eastbourne.

Drosophila.—*M. auraria* (Artemis) larvae (English, Irish and Scotch).
Diptera.—Numerous ova, larvae, pupae and imagoes.—*H. W. Head*.
 Burnaston, Scarborough.

CHANGES OF ADDRESS.—T. B. D. Bell, Esq., to "Lynton", Grange Road, Guernsey, G.I. W. E. Bushbridge, Esq., to "Gresham", Bradbourne Park Road, Sevenoaks, Kent. Major J. J. Jacobs, to "The Priory", Broomfield, near Diss, Norfolk. T. Wigley, Esq., to British Consulate General, Genoa, Italy.

APATURA IRIS

Healthy Larvae (ready May), 42¢ per doz.

Cash and Cash Equivalents

A. B. SMITH, c/o Editor

The Entrepreneur: A New Breed of Man

LEONARD TATCHELL

SWANAGE BORSET

SEND FOR FREE LISTS

Established 1907

FOR SALE

Copy of *Entomologist*, volume 2, 1912

1990-1991

Period: 1911-1928; unbound.

12. *Microtus* 1800 Nelson bred 1914
 13. *Peromyscus* 20 American Cabinet

Vol. 10, No. 263

100-443887-100

ENTOMOLOGIST / BACK NUMBERS

WANTED

Full published prices will be paid by the Publishers for the following:

U.S. LAW: FEB 1987 100-11 110-5012

APR MAY 1948 JULY 1949 JAN 1950

South American Butterflies - Special Collections FOR SALE

[illegible]

the same month and preparation and with exact localities.

Each day now

S. JARSEN "RISLEBUK" FAABORG DENMARK

NOW READY

LABEL AND EXCHANGE LISTS OF
British Neuroptera, Paraneuroptera, Orthoptera,
Trichoptera, Ephemeroptera, Plecoptera.

To be obtained from: **AMERICAN JOURNAL OF MATHEMATICS**, 23 West Street, N.Y.C. 1

Pages in set: 1st 3rd 5th 6th 7th 8th 9th 10th 11th 12th 13th 14th 15th 16th 17th 18th 19th 20th 21st 22nd 23rd 24th 25th 26th 27th 28th 29th 30th 31st 32nd 33rd 34th 35th 36th 37th 38th 39th 40th 41st 42nd 43rd 44th 45th 46th 47th 48th 49th 50th 51st 52nd 53rd 54th 55th 56th 57th 58th 59th 60th 61st 62nd 63rd 64th 65th 66th 67th 68th 69th 70th 71st 72nd 73rd 74th 75th 76th 77th 78th 79th 80th 81st 82nd 83rd 84th 85th 86th 87th 88th 89th 90th 91st 92nd 93rd 94th 95th 96th 97th 98th 99th 100th 101st 102nd 103rd 104th 105th 106th 107th 108th 109th 110th 111th 112th 113th 114th 115th 116th 117th 118th 119th 120th 121st 122nd 123rd 124th 125th 126th 127th 128th 129th 130th 131st 132nd 133rd 134th 135th 136th 137th 138th 139th 140th 141st 142nd 143rd 144th 145th 146th 147th 148th 149th 150th 151st 152nd 153rd 154th 155th 156th 157th 158th 159th 160th 161st 162nd 163rd 164th 165th 166th 167th 168th 169th 170th 171st 172nd 173rd 174th 175th 176th 177th 178th 179th 180th 181st 182nd 183rd 184th 185th 186th 187th 188th 189th 190th 191st 192nd 193rd 194th 195th 196th 197th 198th 199th 200th 201st 202nd 203rd 204th 205th 206th 207th 208th 209th 210th 211th 212th 213th 214th 215th 216th 217th 218th 219th 220th 221st 222nd 223rd 224th 225th 226th 227th 228th 229th 230th 231st 232nd 233rd 234th 235th 236th 237th 238th 239th 240th 241st 242nd 243rd 244th 245th 246th 247th 248th 249th 250th 251st 252nd 253rd 254th 255th 256th 257th 258th 259th 260th 261st 262nd 263rd 264th 265th 266th 267th 268th 269th 270th 271st 272nd 273rd 274th 275th 276th 277th 278th 279th 280th 281st 282nd 283rd 284th 285th 286th 287th 288th 289th 290th 291st 292nd 293rd 294th 295th 296th 297th 298th 299th 300th 301st 302nd 303rd 304th 305th 306th 307th 308th 309th 310th 311th 312th 313th 314th 315th 316th 317th 318th 319th 320th 321st 322nd 323rd 324th 325th 326th 327th 328th 329th 330th 331st 332nd 333rd 334th 335th 336th 337th 338th 339th 340th 341st 342nd 343rd 344th 345th 346th 347th 348th 349th 350th 351st 352nd 353rd 354th 355th 356th 357th 358th 359th 360th 361st 362nd 363rd 364th 365th 366th 367th 368th 369th 370th 371st 372nd 373rd 374th 375th 376th 377th 378th 379th 380th 381st 382nd 383rd 384th 385th 386th 387th 388th 389th 390th 391st 392nd 393rd 394th 395th 396th 397th 398th 399th 400th 401st 402nd 403rd 404th 405th 406th 407th 408th 409th 410th 411th 412th 413th 414th 415th 416th 417th 418th 419th 420th 421st 422nd 423rd 424th 425th 426th 427th 428th 429th 430th 431st 432nd 433rd 434th 435th 436th 437th 438th 439th 440th 441st 442nd 443rd 444th 445th 446th 447th 448th 449th 450th 451st 452nd 453rd 454th 455th 456th 457th 458th 459th 460th 461st 462nd 463rd 464th 465th 466th 467th 468th 469th 470th 471st 472nd 473rd 474th 475th 476th 477th 478th 479th 480th 481st 482nd 483rd 484th 485th 486th 487th 488th 489th 490th 491st 492nd 493rd 494th 495th 496th 497th 498th 499th 500th 501st 502nd 503rd 504th 505th 506th 507th 508th 509th 510th 511th 512th 513th 514th 515th 516th 517th 518th 519th 520th 521st 522nd 523rd 524th 525th 526th 527th 528th 529th 530th 531st 532nd 533rd 534th 535th 536th 537th 538th 539th 540th 541st 542nd 543rd 544th 545th 546th 547th 548th 549th 550th 551st 552nd 553rd 554th 555th 556th 557th 558th 559th 560th 561st 562nd 563rd 564th 565th 566th 567th 568th 569th 570th 571st 572nd 573rd 574th 575th 576th 577th 578th 579th 580th 581st 582nd 583rd 584th 585th 586th 587th 588th 589th 590th 591st 592nd 593rd 594th 595th 596th 597th 598th 599th 600th 601st 602nd 603rd 604th 605th 606th 607th 608th 609th 610th 611th 612th 613th 614th 615th 616th 617th 618th 619th 620th 621st 622nd 623rd 624th 625th 626th 627th 628th 629th 630th 631st 632nd 633rd 634th 635th 636th 637th 638th 639th 640th 641st 642nd 643rd 644th 645th 646th 647th 648th 649th 650th 651st 652nd 653rd 654th 655th 656th 657th 658th 659th 660th 661st 662nd 663rd 664th 665th 666th 667th 668th 669th 670th 671st 672nd 673rd 674th 675th 676th 677th 678th 679th 680th 681st 682nd 683rd 684th 685th 686th 687th 688th 689th 690th 691st 692nd 693rd 694th 695th 696th 697th 698th 699th 700th 701st 702nd 703rd 704th 705th 706th 707th 708th 709th 710th 711th 712th 713th 714th 715th 716th 717th 718th 719th 720th 721st 722nd 723rd 724th 725th 726th 727th 728th 729th 730th 731st 732nd 733rd 734th 735th 736th 737th 738th 739th 740th 741st 742nd 743rd 744th 745th 746th 747th 748th 749th 750th 751st 752nd 753rd 754th 755th 756th 757th 758th 759th 760th 761st 762nd 763rd 764th 765th 766th 767th 768th 769th 770th 771st 772nd 773rd 774th 775th 776th 777th 778th 779th 780th 781st 782nd 783rd 784th 785th 786th 787th 788th 789th 790th 791st 792nd 793rd 794th 795th 796th 797th 798th 799th 800th 801st 802nd 803rd 804th 805th 806th 807th 808th 809th 810th 811th 812th 813th 814th 815th 816th 817th 818th 819th 820th 821st 822nd 823rd 824th 825th 826th 827th 828th 829th 830th 831st 832nd 833rd 834th 835th 836th 837th 838th 839th 840th 841st

CONTENTS.

An Attempt to Breed from *Lysandra coridon* Poda, var. *Syngrapha* Keff., S. G. Castle Russell, F.R.E.S., 77. A List of Lepidoptera from which Parasites are Particularly Desired, D. S. Wilkinson, F.R.E.S., 81. *Gonepteryx rhamni* L.: A Note on the Larva, H. J. Burkill, M.A., F.R.G.S., 85. Some Records of British Trichoptera in 1933, Martin E. Mosely, F.R.E.S., 87. Notes on Braconidae. XV.—Microgasterinae, Claude Morley, F.R.E.S., F.G.S., F.Z.S. (continued from p. 67), 90.

NOTES AND OBSERVATIONS.—Macrolepidoptera of Ireland, Bryan Beirne, 80. *Danaus plexippus* in South Cornwall, F. Pennington, 94. *Vanessa atalanta* in March, William E. Busbridge, 94. *Sphinx convolvuli* in Dorset, A. L. Capener, 94. *Larentia ocellata* Larvae and *Aglais urticae* Unaffected by Frost, P. P. Milman, 94. Butterflies in North Lancashire, Second Brood *Erynnis tages*, Albert E. Wright, 94. Diptera in Dumfriesshire, Jas. Murray, 95.

RECENT LITERATURE, 84, 86, 96.

SOCIETIES.—Royal Entomological Society of London, 99. Entomological Club, 100. Birmingham Natural History Society: Entomological Section, 100.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest stations, South Kensington and Gloucester Road).—*Wednesdays, April 1st and May 6th, 1936.* The LIBRARY is open daily 10 a.m. to 6 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays; to 10 p.m. meeting nights; closed during September.—*Hon. Sec., A. W. McKENNY HUGHES.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge, S.E.1.—Meetings second and fourth *Thursday* in every month, at 7 p.m.—*Hon. Sec., STANLEY N. A. JACOBS.* "Ditchling," Hayes Lane, Bromley, Kent.

LONDON NATURAL HISTORY SOCIETY.—Meetings first four *Presdays* in the month at 6.30 p.m. at The London School of Hygiene and Tropical Medicine, Keppel Street, Gowen Street, W.C.1. Visitors admitted by ticket which may be obtained through Members or from the *Hon. Sec., A. B. HODGKINSON*, 91, Queen's Road, Buckhurst Hill, Essex.

THE SOCIETY FOR BRITISH ENTOMOLOGY, 50, Carlton Crescent, Southampton. Meetings: September to April, third *Saturday* in each month, at 8 p.m.; May to July, third *Wednesday* in each month, at 7 p.m.—*Hon. Sec., E. RIVERHILL GORRIE*, 102, High Street, Southampton.

W. F. H. ROSENBERG

Telephone
PRINCE OF WALES

57 HAVERSTOCK HILL, LONDON, N.W. 3

TRADE AND POST FREE

Price List No. 21, Lepidoptera of the World


(continued from page 10)

Also Special Supplementary List of Duplicates from
the Rosenberg Collection

Illustrations of Lepidoptera and other insects, etc.

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

 NOTICES OF EXCHANGE should be received by the 21ST OF EACH MONTH to insure insertion.

Ova for photographic purposes.—I still require the loan of many species of ova of British Lepidoptera, some of them quite common ones, and shall be happy to forward a desiderata list to anyone who will help me to obtain them.—*Alfred E. Tonge, "Aincroft," Reigate.*

CHANGES OF ADDRESS.—O. N. Hughes, Esq., to 115a, Harley Street, W.1.
The Hon. Mr. J. E. Kempe to The Residency, Trengganu, Malay States.
A. H. Sperring, Esq., to "Slindon", 5th Avenue, Warblington, Havant, Hants.

LEONARD TATCHELL.
Entomologist.
SWANAGE, DORSET.

SEND FOR FREE LIST. Established 1897.

**'ENTOMOLOGIST' BACK NUMBERS
WANTED.**

Full published prices will be paid by the Publishers for the following:

MAR. FEB. APR. 1921. APR. 1922.
MAY, MAY 1923. JULY 1923. JAN. 1924.

W. H. JANSON & SON

Insect Cabinets. first-class make, polished mahogany, dustproof framed cabinet to drawers with mahogany glass-panel door. special hard wood plinth to match. 12 drawers, size 17" x 15" x 2". Price £8 15s.

Microslide Cabinets. polished pine, 28 drawers holding 1800 slides, with glass-panel door. Price £5 5s.

Cabinets, Storeboxes, etc., are our own best make.

MOLL—A New Superfine Material for Lining Cabinets and Storeboxes far superior to Felt or Cork. Samples sent free. We are Sole Agents in Great Britain for Moll.

In response to numerous inquiries for a reliable preparation for the destruction of the "Drain-Water Beetle" and other wood-borers, we are stocking "CEPRINOL" in 1-pint tins, price 2/6, post extra 3d.

Recharging Box. superior aluminium finish, size 8" x 7" x 2", ready for use, will last for several months, price 2/3, post 6d. Fluid for re-charging 4d. post 3d.

Price List sent free.

**P.O. Box 128, 44, Gt. Russell Street,
LONDON, W.C.1**
Phone: MUSEum 1247.

CONTENTS.

Bulgarian Rhopalocera, June and July, 1933. *P. Haig Thomas*, 101. British Lepidoptera Collecting, 1935. *C. G. M. de Worms, Ph.D., F.R.E.S.*, 104. *Acropyga (Rhizomyrma) robæ* sp. nov. (Hym. Formicidae), a New S. American Ant. with Remarks on the Genus, etc. *Horace Donisthorpe, F.Z.S., F.R.E.S., etc.*, 108. A New Species of Danaiidae (Lep. Rhop.) and other New Butterflies, *G. Talbot, F.R.E.S.*, 112. Notes on Braconidae. XV.—Microgasterinae. *Claude Morley, F.R.E.S., F.G.S., F.Z.S.* (continued from p. 94), 115.

NOTES AND OBSERVATIONS.—*Aplasta oponaria* in Kent. *A. W. Hughes*, 107. Wicken Fen Fund, 111. *Gonepteryx rheani*. Note on the Larva. *F. W. Frohawk*, 111. A Week's Collecting near Starcross. *Harold King, D.Sc., F.R.S.*, 114. *Buprest (Coleoptera) sylvaticella* Wood. and *Lithocolletis distentella* Zell. in East Kent. *F. W. Daltry*, 114. Second Brood of *Erynias tages*. *F. W. Frohawk*, 119. Trichoptera in the Austrian Tyrol. *Marion S. Massey*, 119. The Nash Collection. *W. E. S.*, 120.

Recent Literature, 123.

SOCIETIES.—The South London Entomological and Natural History Society, 124.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W.7 (nearest stations, South Kensington and Gloucester Road).—*Wednesdays, May 6th, and June 3rd, 1936.* The LIBRARY is open daily 10 a.m. to 6 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays; to 10 p.m. meeting nights; closed during September.—*Hon. Sec., A. W. McKENNY HUGHES.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. *Hibernia Chambers, London Bridge, S.E.1.*—Meetings second and fourth *Thursday* in every month, at 7 p.m.—*Hon. Sec., STANLEY N. A. JACOBS.* "Ditchling," Hayes Lane, Bromley, Kent.

LONDON NATURAL HISTORY SOCIETY.—Meetings first and third *Tuesdays* in the month at 6.30 p.m. at The London School of Hygiene and Tropical Medicine, Keppel Street, Gowar Street, W.C.1. Visitors admitted by ticket, which may be obtained through Members or from the Hon. Sec., A. B. ROSE, 57, Haverstock Hill, London, N.W.3.

THE SOCIETY FOR BRITISH ENTOMOLOGY, 30, Cannon Green, Southampton.—Meetings: September to April, third *Saturday* in each month, at 8 p.m.; May to July, third *Wednesday* in each month, at 7 p.m.—*Hon. Sec., E. RUTENFRANZ-GOVER, M2, High Street, Southampton.*

W. F. H. ROSENBERG

Telephone
FREDRICK 3411

57, HAVERSTOCK HILL, LONDON, N.W.3

GRATIS AND POST FREE

Price List No. 31, *Lepidoptera of the World*

(New and Revised Edition)


Also: *Special Supplementary List*, 1935, and *Index to the Lepidoptera of the World*, 1935.

Orders and enquiries to the Author, W. F. H. ROSENBERG

57, Haverstock Hill, London, N.W.3, England

EXCHANGE.

The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused. *Marked * are bred.*

 **NOTICES OF EXCHANGE** should be received by the 21st OF EACH MONTH to insure insertion.

FOR SALE

32-drawer Mahogany Cabinet, interchangeable, 15" x 16"; also Black Bidentata, cheap.

Box No. 50, c/o Editor, 'The Entomologist.'

ADVERTISER will pay well for a few dozen larvae of *Tinea pellionella* (Case-feeding Clothes Moth).

HEAD,

Spring Gardens, Solva, Pembrokeshire.

LEONARD TATCHELL,

Entomologist,

SWANAGE, DORSET.

SEND FOR FREE LISTS.

Established 1887.

TWENTY-DRAWER CABINET WANTED.

Gurney or Watkins & Doncaster.

Apply Box No 121,

c/o Editor 'The Entomologist.'

W. H. JANSON & SON

Insect Cabinets, first-class make, polished as mahogany, dustproof framed covers to drawers, with mahogany glass-panel door; special hard-wood plinth to stand on; 12 drawers, size 17" x 15" x 2". Price £8 15s.

Microslide Cabinets, polished pine, 28 drawers holding 1008 slides, with glass-panel door. Price 25 5s.

Cabinets, Storeboxes, etc. are our own best make.

MOLL is a New Superfine Material for Lining Cabinets and Storeboxes, far superior to Peel or Cork. Samples sent free.

We are Sole Agents in Great Britain for Moll.

In response to numerous inquiries for a reliable preparation for the destruction of the "Death Watch Beetle" and other wood-borers, we are stocking "CUPRINOX" in 8-pint tins, price 2/6, post extra 5d.

Relaxing Box, superior aluminium finish, size 7" x 5" x 2", ready for use, will last for several months, price 2/9, post 6d. Fluid for re-charging 4d, post 3d.

Price List sent free.

P.O. Box 128, 44, Gt. Russell Street,

Phone: MUSEum 1287.

LONDON, W.C.1

CONTENTS.

The Collection and Analysis of Records of Migrating Insects, British Isles, 1931-1935, Mrs. K. J. Grant, F.R.S.E., 127. British Lepidoptera Collecting, 1935, C. G. M. de Worms, Ph.D., F.R.E.S., continued from p. 107, 132. Bulgarian Rhopalocera, June and July, 1933, P. Haly Thomas (concluded from p. 103), 136. Notes on Braconidae, XV.—Microgasterinae, Claude Morley, F.R.E.S., F.G.S., F.Z.S. (continued from p. 119), 140.

NOTES AND OBSERVATIONS.—*Hadena saturata* at Wicken, H. M. Edleston, 131. *Pyrgus alvens* in Norfolk, Frank Leney, 131. Second Brood *Erynnis tages*, J. A. Whellan, 131. *Vanessa atalanta* in April, Dennis E. Ballinger, 131. Records of *Polygonia c-album* in 1935, N. D. R., 139. An Old Record of *Vanessa antiopa*, N. D. R., 143. Lepidoptera near Lands End, Harold King, D.Sc., F.R.S., 143. *Macroglossa stellatarum* Taking a Sea Passage on a Steamer, B. Tullach (Brig.-Gen.), 143. *Heterocera* Attacking *Cotoneaster horizontalis* and *microphylla*, H. Stringer, 144.

RECENT LITERATURE, 144.

SOCIETIES.—South London Entomological Society, 148.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest stations, South Kensington and Gloucester Road).—*Wednesdays, June 3rd and October 7th, 1936.* The LIBRARY is open daily 10 a.m. to 6 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays; to 10 p.m. meeting nights; closed during September.—*Hon. Sec., A. W. McKENNY HUGHES.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge, S.E. 1.—Meetings second and fourth *Thursday* in every month, at 7 p.m.—*Hon. Sec., STANLEY N. A. JACOBS*, "Ditchling", Hayes Lane, Bromley, Kent.

LONDON NATURAL HISTORY SOCIETY.—Meetings first four *Tuesdays* in the month at 6.30 p.m. at The London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. 1. Visitors admitted by ticket, which may be obtained through Members or from the *Hon. Sec., A. R. HORN-BLOWER*, 91, Queen's Road, Buckhurst Hill, Essex.

THE SOCIETY FOR BRITISH ENTOMOLOGY, 30, Carlton Crescent, Southampton. Meetings: September to April, third *Saturday* in each month, at 3 p.m.; May to July, third *Wednesday* in each month, at 7 p.m.—*Hon. Sec., E. RIVENHALL GOFFE*, 102, High Street, Southampton.

W. F. H. ROSENBERG

Telephone
BRIDPORT 544

57, HAVERSTOCK HILL, LONDON, N.W. 9

GRATIS AND POST FREE

Price List No. 31, Lepidoptera of the World

(117 plates and many other lists)

Also Special Supplementary List of Butterflies from
The Oberthur Collection

including scarce species from Siberia and other desirable localities

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

NOTICES OF EXCHANGE should be received by the 21st of EACH MONTH to insure insertion.

Ova for photographic purposes.—I still require the loan of many species of ova of British Lepidoptera, some of them quite common ones, and shall be happy to forward a desiderata list to anyone who will help me to obtain them.—*Alfred E. Tonge, "Aircraft," Reigate.*

CHANGES OF ADDRESS.—G. C. Danby, Esq., to "Sberingham," 31, Albion Road, Sutton, Surrey. Rev. J. W. Metcalfe to "Holmbank," Westcott, Surrey. G. M. Russell, Esq., to "Woodside," Minstead, Lyndhurst.

LEONARD TATCHELL

Entomologist.

SWANAGE, DORSET.

SEND FOR FREE LISTS. Established 1907.

TWENTY-DRAWER CABINET WANTED.

Apply Box No 121,
c/o Editor 'The Entomologist'.

FOR SALE.—N. phaeocroceus larvae

6d. doz.; O. yonagatae ova, 1/- doz.
S. parvus 1/6, 5d. doz.; P. machaon ova
6d. doz. larvae (later), 2/- doz. Pupae
1/6 doz. ALL GUARANTEED BRITISH.

Box 51, 7, McKay Rd., Wimbledon, S.W. 20.

'ENTOMOLOGIST' BACK NUMBERS WANTED.

Full published prices will be paid
by the Publishers for the following:

JAN. FEB. & JUNE 1901. AUG. 1912.
MAY, MAY 1913. SEPT. & OCT. 1913.

In the Heart of the New Forest

THE WATERSPLASH HOTEL

BROCKENHURST.

Hants.

TEL. BROCKENHURST 244.

Beautiful grounds; fine, well-equipped house; hot and cold water in bedrooms; excellent beds. Photographic dark room. Terms 3/- to 5 guineas per week. Special long period terms. Illustrated brochure on application.

TO ADVERTISERS.

THE ENTOMOLOGIST is an excellent medium for bringing into touch those who desire to sell with the entomologists who buy.

REVISED SCALE OF CHARGES.

Whole Page, 32 12s. 6d. Half-page, 21 10s. Quarter-page, 17/6.

Eighth-page, 10/- Small Panel, 1/-.

Series discount, 5% for six, 10% for twelve.

An advertiser writes: "Please insert advt. in 'The Entomologist' as before and enclosed results from first issue."

M. D. RILEY, 7, MCKAY ROAD, WIMBLEDON, S.W. 20.
OR DIRECT TO PUBLISHERS.

CONTENTS.

Notes on British Odonata in 1934 and 1935. *J. Cowley, F.R.E.S.*, 149. Migration Records, 1936, *Capt. T. Dunmoreuther, R.N.*, 154. British Lepidoptera Collecting, 1935, *C. G. M. de Worms, Ph.D., F.R.E.S.* (concluded from p. 135), 157. A New Species of African Lasiocampidae Belonging to the Genus *Pachypasa* Walker 1855 (Lepidoptera), *W. H. T. Tams*, 160. Notes on Braconidae. XV.—Microgasterinae, *Claude Morley, F.R.E.S., F.G.S., F.Z.S.* (continued from p. 142), 161. New Dryopidae from the Japan Empire (Coleoptera), *Howard Everest Hinton*, 164.

NOTES AND OBSERVATIONS.—*Colias croceus* in North Wales, 1935, *B. H. Crabtree*, 153. *Euproctis chrysorrhoea* in Essex, *H. E. Chipperfield*, 156. The Type Locality of *Chionaspis asparagi* Laing and Cockerell, *T. D. A. Cockerell*, 156. Second Brood *Erynnis tages*, *Douglas M. Mollison*, 159. Ephestia Larvae Eating Dead Larvae of their Own Species, *Raymond V. Huddleston*, 159. *Gnathotemora* in Groydon, *E. H. Wild*, 163. *Papilio machaon* in Kent, The *St. Hon.* Lord Justice Scott, 168. An Observed Immigration of Butterflies at Studland Bay Dorset, 168. *Vanessa cardui* Migration in United States, 1935, 169. *Cosmophila sabulifera* in Kent, *T. R. H. Smith (Capt.) (retd.)*, 169.

RECENT LITERATURE, 169

SOCIETIES.—South London Entomological and Natural History Society, 171. Entomological Club, 172.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest stations: South Kensington and Gloucester Road).—*Wednesday, October 7th, 1936.* The LEXARI is open daily 10 a.m. to 6 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays; 4 to 10 p.m. meeting nights; closed during September.—*Hon. Sec. A. W. McKEATH FICUS.*

COLLECTORS. Have see my 1936 Price List of Set Insects, Voucher Ova, Living Larvae and Pupae, Entomological Apparatus and Books? If not, write for your copy now, gratis and post free. New Breeding Cages, 3/- each, post free. Living Larvae *T. polymorphus* 1/6 dozen, post free.

DENNIS E. BALLINGER, Entomologist and Naturalist.
"The Cottage," Canham Road, Acton, W. 3.

J. J. HILL & SON, ENTOMOLOGICAL CABINET MANUFACTURERS

Best in class—Re-conditioned Second-hand Mahogany Insect Cabinets, 40 Glass Storage Cabinets for Specimens.

CABINET WORKS, 12, FIELD ROAD, WOLVERHAMPTON, ENGLAND.

Change of Address—Expiration of Lease


W. F. H. ROSENBERG

91 & 92, WHITECHAPEL LANE, LONDON, E.C. 1

VERY LARGE STOCK OF INSECT CABINETS AND GLASS CASES

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

 **NOTICES OF EXCHANGE** should be received by the 21ST OF EACH MONTH to insure insertion.

Duplicates.—Fertile ova of *M. athalia* (from wild Essex females, June, 1936).
Desiderata.—Ova or larvae of practically any species, especially *S. ligustri*, *C. elpenor* and *S. fagi*.—*Eric W. Classey, 141, Portnall Road, Maida Hill, W. 9.*

LEONARD TATCHELL

Entomologist

SWANAGE, DORSET

SEND FOR FREE LISTS

Established 1907.

ENTOMOLOGIST BACK NUMBERS

WANTED.

Full published prices will be paid by the Publishers for the following:

JAN. FEB. JUNE 1961 AUG. 1912

MAR. MAY 1918 JULY 1919 JAN. 1920

In the Heart of the New Forest

THE WATERSPLASH HOTEL

BROCKENHURST,
Hants.

Tel.: BROCKENHURST 244

Beautiful grounds, fine, well-equipped house; hot and cold water in bedrooms, excellent beds, Photographic dark room. Terms 3/- to 5 guineas per week. Special long period terms. Illustrated brochure on application.

W. H. JANSON & SON

Insect Cabinets, first-class make, polished as mahogany, dustproof framed covers to drawers, with mahogany glass-panel door; special hard-wood plinth to stand wear; 12 drawers, size 17" x 15" x 2" Price £8 15s.

Microslide Cabinets, polished pine, 28 drawers holding 1000 slides, with glass-panel door Price £5 5s.

Cabinets, Storeboxes, etc., are our own best make.

MOLL—a New Superfine Material for Living Cabinets and Storeboxes, far superior to Peat or York. Samples sent free.

We are Sole Agents in Great Britain for Moll.

In response to numerous inquiries for a reliable preparation for the destruction of the "Death Watch Beetle" and other wood-borers, we are stocking "CUPRINOL" in 1-pint tins, price 2/6, post. extra 5d.

Relaxing Box, superior aluminium finish, size 7" x 5" x 2", ready for use, will last for several months, price 2/3, post. 6d. Fluid for re-charging 4d., post. 3d.

Price List sent free.

P.O. Box 128, 44, Gt. Russell Street,

Phone: MUSEum 1287.

LONDON, W.C.1

CONTENTS.

A List of British Gynandromorphous Specimens of *Argynnis papia* Linn. (1758), *S. G. Castle-Russell*, 173. Observations on the Biology of Certain British Psyllidae, *George Heslop Harrison*, B.Sc., Ph.D., 175. New African Lymantriidae (Lep.), *C. L. Collenette*, F.R.E.S., 178. Migration Records, 1936, *Capt. T. Dannreuther*, R.N., 182. Notes on Braconidae: XV.—Microgasterinae, *Claude Morley*, F.R.E.S., F.G.S., F.Z.S. (continued from p. 163), 187.

NOTES AND OBSERVATIONS.—*Apatura iris* in Surrey, *Ed.*, 174. *Hyloicus pinastri* in the New Forest, *Mervyn J. L. Davis*, 177. A Curious Food-Plant for *Pyrria umbra*, *H. M. Edleston*, 177. *Nymphalis antiopa* L. in Wilts, *F. A. Labouchere* (Col.), 181. *Nymphalis polychloros* in Cornwall and Hants, *C. Nicholson*, 181. *Vanessa atalanta* ab. *fracta* Tutt. in the South of France, (Lt. Col.) *H. D. Peile*, 181. *Zygaena lonicera* Larvae Feeding on Pennywort, *E. W. Classey*, 186. *Libellula depressa* in Yorkshire, *C. W. V. Gane*, 186. Colour Scheme of *Polygonia calbum*, *B. Tulloch* (Brig.-Gen.), 191. *Mimas tiliae* in Staffordshire, *I. D. W. Knowles*, 191. *Plusia interrogationis* Unusually Abundant, *C. W. V. Gane*, 191. Ceratopogonids on Wings of Dragonflies, *J. Cowley*, 192. Midges Attacking Caterpillars, *F. W. Edwards*, 192. Ceratopogonine Flies Sucking Geometrid Larvae, *T. Bainbridge Fletcher*, 192. A Handbook on British Caddis Flies (Trichoptera), 193.

RECENT LITERATURE, 193.

SOCIETIES.—South London Entomological and Natural History Society, 194. Entomological Club, 195.

OBITUARY, 195.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest stations, South Kensington and Gloucester Road).—Wednesday, October 7th, 1936. The Library is open daily 10 a.m. to 6 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays; to 10 p.m. meeting nights; closed during September.—Hon. Sec., A. W. McKENNY HUGHES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge, S.E.1.—Meetings second and fourth Thursday in every month, at 7 p.m.—Hon. Sec., STANLEY N. A. JACOBS, "Ditchling", Hayes Lane, Bromley, Kent.

LONDON NATURAL HISTORY SOCIETY.—Meetings first four Tuesdays in the month at 6.30 p.m. at The London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1. Visitors admitted by ticket, which may be obtained through Members or from the Hon. Sec., A. B. HONGBLOWER, 91, Queen's Road, Birkhurst Hill, Essex.

THE SOCIETY FOR BRITISH ENTOMOLOGY, 30, Carlton Crescent, Southampton. Meetings: September to April, third Saturday in each month, at 3 p.m.; May to July, third Wednesday in each month, at 7 p.m.—Hon. Sec., R. HUYEFELT GORRE, 102, High Street, Southampton.

Change of Address—Expiration of Lease

W. F. H. ROSENBERG

Due to alterations that he is compelled to


91 & 94, Whitechurch Lane, Edgware, Mx.

where business will be carried on as before.

VERY LAMBS, PINE & CATTLE SUPPLIERS AT LOW PRICES.

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

 **NOTICES OF EXCHANGE** should be received by the 21st of EACH MONTH to insure insertion.

Ova for photographic purposes.—I still require the loan of many species of ova of British Lepidoptera, some of them quite common ones, and shall be happy to forward a desiderata list to anyone who will help me to obtain them.—*Alfred E. Tonge, "Aircraft," Reigate.*

CHANGES OF ADDRESS.—C. J. Brooks, Esq., to 49, Harvard Court, Honeybourne Road, N.W. 6. P. N. Crow, Esq., to "Heathcote," Cookham, Dean, Berks. Brigadier W. H. Evans, C.S.I., C.I.E., D.S.O., to 14, Harrington Gardens, S.W. 7.

LEONARD TATCHELL

Entomologist

SWANAGE, DORSET.

SEND FOR FREE LISTS.

Established 1907.

'ENTOMOLOGIST' BACK NUMBERS WANTED.

Full published prices will be paid by the Publisher for the following:

JAN. FEB. MARCH 1911, APRIL 1912.

MAY, MAY 1913, JULY 1913, JAN. 1923.

J. J. HILL & SON, ENTOMOLOGICAL CABINET MANUFACTURERS.

Have for disposal Re-conditioned Second-hand Mahogany Insect Cabinets; also Cheap Storage Cabinets for Insects. Specifications and Prices sent post free on application.

CABINET WORKS, YEWFIELD ROAD, N.W. 10. Phone: WILLESDEN 0309.

NOW

READY.

LABEL AND EXCHANGE LISTS OF

British Neuroptera, Paraneuroptera, Orthoptera, Trichoptera, Ephemeroptera, Plecoptera.

To be obtained from ADLARD & SON, Ltd., 21, Hart Street, W.C. 1.

Prices for each List: 3d. single copies, 1/- for 6, post free.

TO ADVERTISERS.

THE 'ENTOMOLOGIST' is an excellent medium for bringing into touch those who desire to sell with the entomologists who buy.

REVISED SCALE OF CHARGES.

Whole Page, 23 1/2s. 6d. Half-page, 11 1/2s. Quarter-page, (1/6).

Eighth-page, 10/- Small Panel, 5/-

Series discount: 5% for six; 10% for twelve.

An Advertiser writes: "Please insert advt. in 'The Entomologist' as before, had splendid results from first issue."

H. D. RILEY, 7, MCKAY ROAD, WIMBLEDON, S.W. 20.
OR DIRECT TO PUBLISHERS.

CONTENTS.

Notes on Lepidoptera Collected during 1935, *S. Falck*, 197. Tolago and its Butterflies, *W. G. Sheldon*, 200. Notes on Braconidae, XV.—Microgasterinae, *Claude Morley, F.R.E.S., F.G.S., F.Z.S. (concluded from p. 191),* 209.

NOTES AND OBSERVATIONS.—Early Emergence of *Scoliopteryx libatrix*, *William E. Bushbridge*, 199. *Encosma brunniclana* L., *W. G. Sheldon*, 208. *Macroglossum stellatarum* at Hastings, *J. R. LeB. Tomlin*, 203. *Argynnis paphia* ab. *valezina* in Kent, *L. W. Newman, F.R.E.S.*, 215. *Nymphalis polychloros* in Suffolk, *W. S. Gilles*, 215. *Coilas croceus* in Wales, *J. A. Whellan*, 215. Notes on *Polygonia e-album* L., *J. A. Whellan*, 215. *Mimas tiliae* in Staffordshire, *E. S. Lewis*, 216. *Pieris manni* Mayer, Autumn Form, at Menton, *Lt. Col. Peile*, 216. Food-plant of *Tyria jacobaeae*, *Rev. J. E. Hall, D.Sc.*, 216. Southern Forms of *Encosma solandriana*, *R. E. E. Frampton*, 217. *Hyponomeuta rorella* Hb. Seriously Damaging Willows in Suffolk, *Ernest T. Goldsmith*, 217. *Callimorpha hera* at Exeter, *R. M. Pringle*, 218. *Annota alboguttata* Wahlb. in Dorset (Diptera, Drosophilidae), *F. W. Edwards*, 218. The British Species of *Ilisia* (Diptera, Tipulidae), *F. W. Edwards*, 218. Erioptera *riedeli* Lackschewitz in Scotland—An Addition to the British Tipulid Fauna, *F. W. Edwards*, 219. Two Diptera (Phoridae) New to the British List, *F. W. Edwards*, 219. Empididae at Chedworth, Glos., *F. W. Edwards*, 220.

SOCIETIES.—South London Entomological and Natural History Society, 220.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest stations, South Kensington and Gloucester Road)—*Wednesday, October 7th, 1936.* The Library is open daily 10 a.m. to 6 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays, to 10 p.m. meeting nights; closed during September.—Hon. Sec., A. W. MCKENRY HUGHES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibiscus Chambers, London Bridge, S.E. 1.—Meetings second and fourth *Thursdays* in every month, at 7 p.m.—Hon. Sec., STANLEY H. A. JACOBS, "Ditching", Hayes Lane, Bromley, Kent.

LONDON NATURAL HISTORY SOCIETY.—Meetings first four *Tuesdays* in the month at 6.30 p.m. at The London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. 1. Visitors admitted by Special Permit may be obtained through Members or from the Hon. Sec., A. R. HENDERSON, 91, Queen's Road, Beckenham Hill, Essex.

THE SOCIETY FOR BURNING ENTOMOLOGISTS, 30, Carleton Crescent, Southampton. Meetings September to April, third *Saturday* in each month, at 9 p.m.; May to July, third *Wednesday* in each month, at 7 p.m.—Hon. Sec., R. KINGSMA, Grove, 102, High Street, Southampton.

Change of Address—Expiration of Lease

W. F. H. ROSENBERG

has to vacate the premises removed to

31 & 34, Whitechurch Lane, Edgware, M.C.

that former stock list should be sent to the new address.

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

NOTICES OF EXCHANGE should be received by the 21st OF EACH MONTH to insure insertion.

Ova for photographic purposes.—I still require the loan of many species of ova of British Lepidoptera, some of them quite common ones, and shall be happy to forward a desiderata list to anyone who will help me to obtain them.—*Alfred E. Tonge, "Aincroft," Reigate.*

CHANGES OF ADDRESS.—S. Annable, Esq., to 44, Coppice Road, Arnold, Nottingham. Frank L. Hatcher, Esq., to 18, St. Edmunds Drive, Stanmore, Middlesex. J. Hooper, Esq., to "Pensarn", 88, Thornes Road, Wakefield. C. E. Morris, Esq., to "The Cottage", Hollingbourne, Kent. Dr. A. W. Pickard-Cambridge to The University, Sheffield 10.

LEONARD TATCHELL.

Entomologist.

SWANAGE, DORSET.

SEND FOR FREE LISTS.

Established 1907.

'ENTOMOLOGIST' BACK NUMBERS

WANTED

Full published prices will be paid by the Publishers for the following:

JAN. FEB. JUNE 1901. AUG. 1912.

MAR., MAY, 1918. JULY, 1919. JAN. 1920.

W. H. JANSON & SON

Insect Cabinets, all sizes, our own make, at reasonable prices, e.g., 10-dr. Cabinet with mahogany glass-panel door; drawers size $16\frac{1}{2}'' \times 11'' \times 2''$ £5 5s.

Storeboxes, polished, cork-lined $2\frac{1}{2}''$ deep, and MOLL-lined $3\frac{1}{2}''$ deep, for long pins both sides.

Pins, English sizes, silvered and black; Continental sizes, silvered, black steel and non-corrosive steel.

Nets, kite shape and folding patterns for all purposes. Ideal pocket net, high spring steel frame $9''$ diam.; folds with a twist to $3''$ diam. to fit pocket. Complete with bag 5/6

Killing Bottles for Lepidoptera, Coleoptera, etc.

Aspirators, used for collecting all small insects by suction, unbreakable cylinder 2/6

Setting Boards, oval, flat and deep-groove pattern for the long pins.

Relaxing Box, superior aluminium finish, size $7'' \times 5'' \times 2''$, ready for use, will last for several months, price 2/9, post 6d. Fluid for re-charging 4d., post 3d.

Price List sent free.

P.O. Box 128, 44, Gt. Russell Street,

Phone: MUSeum 1267.

LONDON, W.C.1

CONTENTS.

Some Varieties of British Lepidoptera. *N. D. R.*, 221. Note on the Biology of *Myelois neophanes* (Lep., Pyralidae), *J. C. F. Fryer* and *H. M. Edleston*, 223. Migration Records, 1936, *Capt. T. Dannreuther, R.N.*, 225. Notes on the Distribution of the European Species of the Genus *Melanargia* (Lep. Satyridae), *A. M. Peake*, 231. A New Species of *Earius* Hb. (Lep. Noctuidae), *E. P. Wiltshire*, 239.

NOTES AND OBSERVATIONS.—British Gynandromorphous *Argynnis aglaia*, *S. G. Castle Russell*, 222. A Second Brood of *Argynnis selene*, *J. F. D. Frazer*, 222. *Harse convolvuli* (Linn.) at 10,000 ft., (*Capt. W. B. L. Manley*, 224. *Enargia ulicis* (Lep. Noctuidae) at Brockenhurst, *Denys A. Tidman*, 224. *Nymphalis polychloros* in Norfolk, *C. L. Collenette*, 230. A Rare Gall in Kent, *G. V. Bull*, 230. *Hylophila bicolorana* in Worcestershire, *E. P. Whitecombe*, 230. *Danaus plexippus* in S. Devon, *J. O. N. Wood* (*Captain R.N., retired*), 230. *Asterope boisduvali* Wallgn. at Sea, (*Major*) *J. E. Drysdale*, 230. Early Dates for *Scoliopteryx libatrix*, *T. Bainbridge Fletcher*, 233. *Limenitis camilla*, *Stanley Morris*, 238. Tobacco and its Butterflies, *W. G. Sheldon*, 240. *Nephopteryx similata* Zinck, *H. M. Edleston*, 240. Food-plant of *Tyria jacobaeae*, *B. A. Cooper*, 240. Migrant *Plusia gamma* at nearly 10,000 ft. Caught in a Storm, *R. F. Brotherton*, 241. *Plusia gamma* in Quantity, *B. Tulloch* (*Brig.-Gen.*), 241. Does *Graphiphora plectra* Migrate? *B. A. Cooper*, 242. *Lipopteryx touziana* Pierce, *F. N. Pierce*, 242. *Eucosma brunichana* L.: A Correction, *Ed.*, 242. Pairing of *Volucella bombylans*, *Albert B. Wright*, 242. Probable Occurrence in England of the So-called Typical Race of *Anopheles maculipennis* Mg., *F. W. Edwards*, 242. Inverted Male Hypopygia in *Eriopteris* *Crane*, *F. W. Edwards*, 243.

SOCIETIES.—The South London Entomological Society, 244.

OBITUARY, 244.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest station, South Kensington and Gloucester Road).—*Wednesday, October 7th and 21st, 1936.* The LIBRARY is open daily 10 a.m. to 4 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays; to 16 p.m. meeting nights; closed during September.—*Hon. Sec., A. W. MCKENNY HUDD.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge, S.E. 1.—Meetings second and fourth Thursday in every month, at 7 p.m.—*Hon. Sec., Stanley N. J. JONES*, "Fishling", Hayes Lane, Bromley, Kent.

LONDON NATURAL HISTORY SOCIETY.—Meetings first and fourth Thursday in the month at 4.30 p.m. at The London School of Hygiene and Tropical Medicine, Keppel Street, Covent Garden, W.C. 1. Visitors admitted by ticket, which may be obtained through Members or from the Hon. Sec., A. E. HIND, 41, Queen's Road, Bathurst Hill, Epsom.

Change of Address—Expiration of Lease

W. F. H. ROSENBERG


has removed to

91 & 93, Whitechurch Lane, Edgware, Mx

VERY LARGE STOCK OF ENTOMOLOGICAL BOOKS AND JOURNALS

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] * *Marked * are bred.*

 NOTICES OF EXCHANGE should be received by the 21st OF EACH MONTH to insure insertion.

Ova for photographic purposes.—I still require the loan of many species of ova of British Lepidoptera, some of them quite common ones, and shall be happy to forward a desiderata list to anyone who will help me to obtain them.—*Alfred E. Tonge "Aincroft," Beigate.*

CHANGES OF ADDRESS.—S. G. Castle Russell, Esq., to "Springetts", Seaview Road, Walkford, Highcliffe-on-Sea, Hants. Arnold Turner, Esq., to 19, Wychwood Close, Canons Road, Edgware, Middlesex. Dr. E. Barton White to "St. Merryn", Braunton, N. Devon.

LEONARD TATCHELL,
Entomologist.
SWANAGE, DORSET.

SEND FOR FREE LISTS. Established 1867.

**'ENTOMOLOGIST' BACK NUMBERS
WANTED.**

Full published prices will be paid by the Publishers for the following:

JAN. FEB. JUNE 1901. AUG. 1912.
MAR. MAY 1918. JULY 1919. JAN. 1920.

SALE BY AUCTION

STEVENS' AUCTION ROOMS LTD. will sell on Tuesday, November 10th, the extensive Collection formed by the late C. H. Williams, Esq.

The Collection contains good series and many fine aberrations of the British Macro-Lepidoptera, *P. dispar* (6), *Antiope* (3), *Lathonia* (4), *Coleris* (4), *Livornia* (4), *Sicala* (5), *Centonotus* (6), *Coenosa* (5), *Conformis* (2), *Vindaris* (6), *Exilis* (6) a fine lot of Black *Hartaria*, *Iris*, and one fine ab. *Iole*, a large number of grand abs. of *Coridon* and *Grossularata* and several cabinets and various Entomological Books.

Also the Collection formed by Capt. A. Pearman.

This Collection contains well-set and very perfect specimens of the Macro-Lepidoptera arranged in good store-boxes. There are a number of fine-bred Continental examples of the rarer species such as *Picifolia* and *Antiope*.

Both Collections can be viewed at the Offices of L. W. Newman, Salisbury Road, Bexley, Kent, any day and time by appointment up to November 6th, and at the Auction Rooms on Monday, November 9th, also on morning of Sale.

Catalogues ready end of October, to be obtained from

STEVENS' AUCTION ROOMS LTD.
38, King Street, Covent Garden, W.C. 2.

CONTENTS.

The Life-History of *Lampropteryx atregiata*, Metcalfe, E. A. *Collyer*, D.M., F.R.C.P., 245. An Arrangement for Preventing Larvae from Spinning their Cocoons on Top of the Cocoons of Others, G. A. Brett, 253. Migration Records: 1936, Capt. T. Danureuther, R.N., 255. Notes on Mr. A. M. Peake's Paper on the Distribution of the European Species of the Genus *Melanargia*, W. G. Sheldon, 260.

NOTES AND OBSERVATIONS.—*Colias croceus* at Eastbourne, F. W. Frohawk, 252. *Polygonia c-album* in N. Devon. (Miss) K. M. Hinchcliff, 252. Aberration of *Argynnis cydippe*, S. A. Chartres, 254. Food-Plant of *Tyria jacobaeae*, A. H. Turner, 254. *Erynnis tages*: Probable Second Emergence, A. A. W. Buckstone, 262. *Vanessids* in South Ireland, F. W. Frohawk, 263. "Marking" *Vanessa atalanta*, G. A. Brett, 263. *Limenitis camilla* in Lincolnshire, E. M. Bolton King, 263. *Aglais urticae*: A Correction, G. B. Oliver, 263. Distribution of the Genus *Melanargia* (Lep. Satyridae), G. K. Gregson (Col.), 263. Distribution of the Genus *Melanargia*, B. H. Cooke (Brigadier-General), 264. The Deltoid, *Hypena obsitalis*, Hub., in Ireland, C. Donoran (Lt.-Col., I.M.S. [ret.]), 264. Immigrant Lepidoptera in Outer Hebrides, 1936, J. L. Campbell, 265. *Dicranura hiada*: Late Emergence, G. V. Bull, 265. *Catocala fraxini* at Eastbourne, S. A. Chartres, 266. *Plusia gamma* in Numbers Dead in Snow at 10,000 ft., David Gault, 266. *Scesia tipuliformis* Clerck in Dumfriesshire, Jas. Murray, 266.

SOCIETIES.—The South London Entomological Society, 267. Entomological Club, 268.

CORRECTION, 268.

J. J. HILL & SON, ENTOMOLOGICAL CABINET MANUFACTURERS.

Have for disposal **Re-conditioned Second-hand Mahogany Insect Cabinets**; also **Cheap Storage Cabinets for Insects.**
Specifications and Prices sent post free on application.

CABINET WORKS, YEWFIELD ROAD, N.W. 10. Phone: WILLESDEN 0509.

LEONARD TATCHELL

Entomologist

SWANAGE, DORSET

SEND FOR FREE LISTS. ESTABLISHED 1897.

WANTED TO PURCHASE—

Well-set specimens of British
 Tineæ with data.—Apply Box 191,
 c/o Editor, 'The Entomologist'

Change of Address—Expiration of Lease

W. F. H. ROSENBERG

Begs to announce that he has removed to—

91 & 94, Whitechurch Lane, Edgware, Mx.


where business will be carried on as heretofore.

VERY LARGE STOCK OF EXOTIC LEPIDOPTERA AT LOW PRICES.

PRICE LISTS GRATIS AND POST FREE

EXCHANGE.

[The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

 NOTICES OF EXCHANGE should be received by the 21st OF EACH MONTH to insure insertion.

Duplicates.—Ova of Romney Marsh B. trifolii. *Desiderata.*—Cornish ova or larvae of ditto.—G. V. Bull, Sandhurst, Kent.

Duplicates.—Following back numbers of 'The Entomologist': 34 (Nov. 1866), 47 (Nov. 1867), 49 (Jan. 1868), 51 (Mar. 1868), 85 (1870), 91 (June 1871), 92 (July 1871), 93 (Aug. 1871), 96 (Oct. 1871), 97 (Nov. 1871), 98 (Dec. 1871), 188 (1878), 230 (1882), 259 (1884), 332 (1891), 360 (1893), 368, 371, 373 (1894), 401, 402, 403 (1896), 404, 405, 412-415 (1897), 418-427 (1898), 428-439 (1899), 440-451 (1900). *Desiderata.*—Vol. I (1842). No. 2 (1st Dec. 1864), 11 (1st Feb. 1865), 13 (April 1865), 14 (May 1865), 15 (June 1865), 25 (Dec. 1865), 26 (Mar. 1866), 39 (Mar. 1867), 50 (Feb. 1868), 55 (July 1868), 56 (Aug. 1868), 58 (Oct. 1868), 73 (Jan. 1870), 74 (Feb. 1870), 135 (Apr. 1876), 156 (May 1876), 160 (Oct. 1876), 162 and 163 (Dec. 1876).—C. Granville Clutterbuck, 23, Heathville Road, Gloucester (22nd Oct. 1936).

Duplicates.—*T. betulae**, *Turca**, *Vestigialis* Or*, *Palpina**, *Autumnaria**, *Castanea**, *Semibrunnea**, *Albimaculata**, *Desiderata.*—Concealing Coloration in the Animal Kingdom (Thayer), also many species Noctuae.—A. H. Sperring, "Slendon", Fifth Avenue, Worthington, Hunts.

W. H. JANSON & SON

Insect Cabinets, all sizes, our own make, at reasonable prices, e.g., 10-dr. Cabinet with mahogany glass-panel door, drawers size 16½" x 11" x 2" £5 5s.

Storeboxes, polished, cork-lined 2½" deep, and MOLL-lined 3½" deep for long pins both sides.

Pins, English sizes, silvered and black. Continental sizes, silvered, black steel and non-corrosive steel.

Netts, fine shape and folding patterns for all purposes. Ideal pocket net, light spring steel frame 9" diam., folds with a twist to 2" diam. in pocket. Compact with bag. 5/6

Killing Bottles for Lepidoptera, Coleoptera, etc.

Aspirators, used for collecting all small insects by sucking on flexible tubes. 2/6

Setting Boards, oval, 8½ and 10½ inch diam., with the fine ring pins.

Retaining Box, square, mahogany, 10½ inch diam., 2½ inch high, with lid for use with long fine silvered pins, 10½ inch diam., 2½ inch high, 10½ inch diam., 2½ inch high.

P.O. Box 120, 44, Gt. Russell Street,

Phone: MUSeum 1267.

LONDON, W.C.1.

CONTENTS.

Hypomantis corellus in Suffolk and Norfolk (Lep.). J. C. F. Fraser, O.B.E. M.A., 269. Further Notes on *Zygæna achilleas* and *Z. filipendulæ* in the Western Highlands. Russell James, F.R.E.S., 271. The Butterflies of St. Kitts. Arthur Hall, F.R.E.S., 274. *Rhithrogena semicolorata* Curtis and *R. semitincta* Picot (Ephemeroptera). D. E. Krimmins, 279. New Forms of *Papilio* from the Indo-Australian Region. A. G. Gabriel, F.R.E.S., 281. Descriptions and Figures of New Brazilian Dryopidae (Coleoptera). H. E. Hinton, 283.

NOTES AND OBSERVATIONS.—*Vanessa cardui* and *Polygonia c-album* in West Cornwall. Harold Hodge, 273. *Vanessa atalanta* ab. *fracta*. T. Bainbridge Fletcher, 273. Pupation of *Asteroscopus nubeculosa*. G. Rippon, M.A., F.R.E.S., 275. *Geometris anadra* L. Is it a Migrant? T. Danneberg (Cont.). H.N.T., 282. Gynandrous *Anthracis cardamines* in co. Tyrone. Thomas Green, 286. *Lupinus domesticus*, Dup. in Sussex. G. W. Wynn, 290. An Unusual and Rare Abundance of *Eukhalictyris furcata* Hub. in co. Cork. G. Donovan, (Cont.). H.N.T., 290. Note on *Spilomyia* (Syrphidae). T. D. A. Cochrane, 291. *Catocala nupta* L. in Nottinghamshire. E. V. Hedder, 291. Larva of *Blasia graminis* at Weston-super-Mare, August 25th, 1936. Merrett J. L. Davis, 291. Another *Nephopterix similis* Zk. Claydon-Morley, 292. *Coelisia fava* Stæg. in Oxfordshire (Diptera: Mycetophilidae). F. W. Edwards, 292.

MEETINGS OF SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON, 41, Queen's Gate, S.W. 7 (nearest stations, South Kensington and Gloucester Road).—*Wednesdays, December 2nd, 1936, and January 20th, 1937.* The Library is open daily 10 a.m. to 5 p.m. except Saturdays (10 a.m. to 1 p.m.) and Sundays; to 10 p.m. meeting nights; closed during September.—*Hon. Sec., A. W. MCKENNY HUGHES.*

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY, Hibernia Chambers, London Bridge, S.E. 1.—Meetings second and fourth Thursday in every month, at 7 p.m.—*Hon. Sec., STANLEY N. A. JACOBS.* "Ditchling", Hayes Lane, Bromley, Kent.

LONDON NATURAL HISTORY SOCIETY.—Meetings first four Tuesdays in the month at 6.30 p.m. at The London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C. 1. Visitors admitted by notice, which may be obtained through Members or from the Hon. Sec., A. B. HODGKINSON, 91, Queen's Road, Parkhurst Hill, Essex.

THE SOCIETY FOR BARREN DEPRESSION.—Meetings, September to April, three evenings in each month, at 7 p.m., 10.15 a.m. on Wed. and Thursdays in each month, at 7 p.m., at University College, Gower Street, Bloomsbury.—*Hon. Sec., E. R. HODGKINSON, 105, High Street, Southampton.*

Change of Address—Expiration of Lease


W. F. H. ROSENBERG

91 & 94, Whitechurch Lane, Edgware, Mx.

VERY LARGE STOCK OF ENTOMOLOGICAL BOOKS AT LOW PRICES.

EXCHANGE.

The publication of Notices of Exchange, or of Advertisements, in the 'Entomologist' is in no way a guarantee for the British nationality, authenticity, or good condition of specimens. This Notice is not given to throw doubt on the bona fides of Exchangers or Advertisers, but to absolve the Editor from responsibility, in case the liberty allowed should be abused.] *Marked * are bred.*

 NOTICES OF EXCHANGE should be received by the 21ST OF EACH MONTH to insure insertion.

Duplicates.—Following back numbers of 'The Entomologist': 34 (Nov., 1866), 47 (Nov., 1867), 49 (Jan., 1868), 51 (Mar., 1868), 85 (1870), 91 (June, 1871), 92 (July, 1871), 93 (Aug., 1871), 96 (Oct., 1871), 97 (Nov., 1871), 98 (Dec., 1871), 183 (1878), 230 (1882), 250 (1884), 332 (1891), 360 (1893), 368, 371, 373 (1894), 401, 402, 403 (1896), 404, 405, 412-415 (1897), 416-427 (1898), 428-439 (1899), 440-451 (1900). *Desiderata.*—Vol. I (1842), No. 9 (1st Dec., 1864), 11 (1st Feb., 1865), 13 (April, 1865), 14 (May, 1865), 15 (June, 1865), 50 (Feb., 1868), 55 (July, 1868), 56 (Aug., 1868), 58 (Oct., 1868).—C. Granville Clutterbuck, 23, Heathville Road, Gloucester (25th Nov., 1896).

Wanted.—Second-hand copies of 'Review of Applied Entomology' complete with indices. Will exchange Argentine insects for American Hesperidae.—K. J. Hayward, Experimental Station, Concordia, F.C.E.R. Argentine.

Duplicates.—Aglais, Rhamni, Palaemon, Bucephala*, Gonostigma*, Chrysorrhoea*, Neustria*, Trifolii, Caeruleocephala*, Lutea*, Fulvago*, Ligula, *Desiderata.*—Epiphron, Aethiops, Tullia, Lathonia, Boeticus, Arion, Betulae, Pruni, Lineola; also many species Moths.—E. V. Hudson, 49, Davies Road, West Bridgford, Nottingham.

Desiderata.—Rare and local forms of Butterflies from any part of the world, especially Palearctic Pieridae. *Duplicates.*—C. Fieldii, Erufe (local races) and many others. Lists exchanged.—J. Antony Thompson, Tan-y-Bryn, near Llandadno Junction.

CHANGES OF ADDRESS.—Canon K. St. Aubyn Rogers to Box 1005, Nairobi, Kenya Colony. J. T. Wattison, Esq., to 22, Trafalgar Road, Hartshill, Stoke-on-Trent. G. E. Morris, Esq., to "The Cottage", Lord Romney Hill, Maidstone. Dr. Stanley Kemp to The Laboratory, Citadel Hill, Plymouth. C. G. Lipscomb, Esq., to "Mumfords", Bathaston, Bath.

WANTED TO PURCHASE—

Well-set specimens of British
Insects with data.—Apply Box 191,
c/o Editor, 'The Entomologist.'

'ENTOMOLOGIST' BACK NUMBERS

WANTED.

Full published prices will be paid
by the Publishers for the following:

JAN., FEB., JUNE, 1901. AUG., 1912.
MAR., MAY, 1918. JULY, 1912. JAN., 1920.

J. J. HILL & SON,

ENTOMOLOGICAL CABINET
MANUFACTURERS.

Have for disposal Re-conditioned Second-hand Mahogany
Insect Cabinets; also Cheap Storage Cabinets for
Insects. Specifications and Prices sent post free on application.

CABINET WORKS, YEWFIELD ROAD, N.W. 10. Phone: WILLESDEN 0349.

THE ENTOMOLOGIST.

VOL. LXIX.]

JANUARY, 1936

[No. 872]

MIGRATION RECORDS, 1935.

BY CAPT. T. DANNREUTHER, R.N.

THE Insect Immigration Committee of the South-Eastern Union of Scientific Societies have received the following records since those reported in the *Entomologist*, 68 : 139-41, 161-2, 185-8, 209-12 and 252-9.

(1) *Records of Insect Movement.*

(57) August. *Colias croceus* Fourcr. : At Worth Matravers, Dorset, 12 fresh males flew east, 7th to 9th ; at Hastings, August 12th, after fluttering over the beach and cliff in the forenoon, 7 flew off to the north (H. G. Macleod).

(58) September 27th. *Pieris rapae* L. : At Ewell about 30 fresh specimens flew leisurely to the S.S.W. about 3 p.m. (A. A. W. Buckstone).

(59) September. *Vanessa atalanta* L. : On the 8th, near Swindon, Wilts, 4 were seen flying S.S.W. against a stiff breeze (Rev. D. Percy Harrison) (*Entom.*, 68 : 286). On the 18th, at Epsom, after an absence of two months, 3 appeared flying S.E., and on the 21st 5 more flying S.S.W. (A. A. W. Buckstone).

(60) October. *Vanessa atalanta* L. : On the 7th, at the St. Nicholas Light Vessel, off Gorleston, 3 passed flying S.S.E. at noon (S. G. Sharman). On the same date 6 were seen flying south at Ewell (A. A. W. Buckstone). On the 22nd, at 10 a.m., a single specimen went south out to sea from St. Mary's, Scillies (R. Trotter). On the 28th, at Hastings, 3 were seen flying south out to sea (H. G. Macleod).

(2) *Abnormal Abundance.*

Although some of the records of movement relate to such small numbers as hardly to justify the term migration, there is some indirect evidence of concentration and movement as a swarm, though the actual flights were not recorded. The following are examples of a normal scarcity being interrupted by the sudden appearance of at least a hundred insects for a day or two only, the significance of which can only be determined when the records are analysed in graph form later :

Vanessa cardui : Slieve Croob, N. Ireland, May 5th (*Entom.*, 68 : 185) ; Eastbourne Downs, October 28th and 29th (C. H. Hutchinson) ; St. Columb, Cornwall, June 24th to 30th, "a very large population of Painted Ladies" (M. Rogers).

Vanessa atalanta : St. Mary's, Scillies, September 14th (F. W.

Frohawk); Hastings, September 20th (H. G. Macleod); Eastbourne Downs, October 28th and 29th (C. H. Hutchinson).

Aglais urticae L.: Flamborough Head, Yorks, March 22nd (C. W. V. Gane).

Colias croceus Fourcr.: Thorpe Bay, Essex, end of September (*Entom.*, 68: 256).

Pieris brassicae L.: At Old Bolingbroke, west of Skegness, on October 1st several buckets of larvae destroyed after defoliating cabbage fields (M. V. R. Graham). Species normal elsewhere in Lincolnshire.

Plusia gamma L.: Timoleague, Cork, July 8th (*Entom.*, 68: 257); Hastings, July 4th, August 6th, 7th, and 21st (H. G. M.); Aspley Heath, Beds, August 17th (C. H. K.).

Sphinx ligustri L.: Torquay in autumn (S. T. Stidston).

Agrotis ipsilon Hufn.: Hastings, August 24th to 30th inclusive (H. G. Macleod).

(3) Autumn Records of Insects at Sea.

Report from Mr. J. W. R. Reeve, Lamplighter of the Outer Dowsing Light Vessel, situated 31 miles E.S.E. of Spurn Point. Specimens sent to E. A. Ellis, Castle Museum, Norwich, for identification:

Plusia gamma L.: One captured on October 2nd in a south breeze, misty.

Agrotis exclamatoris L. and *Omphaloscelis lunosa* Haw.: One of each captured in a south breeze and rainy weather on October 3rd.

Calamia lutosa Hbn.: One captured October 5th in a south breeze, misty.

Phlogophora meticulosa L.: One captured on October 27th in a south wind, force 3 to 4.

Report from Mr. S. G. Sharman, Lamplighter of the St. Nicholas Light Vessel, situated one mile off Gorleston, Suffolk. Specimens sent to Castle Museum, Norwich, for identification:

Ennomos alniaria L.: One taken at dawn on September 26th tired out. Wind was south, force 3 (not from the land).

Phlogophora meticulosa L. and *Amathes lychnidis* Hübn.: One of each taken at night in off-shore wind on October 1st.

Calamia lutosa Hübn.: A tired specimen taken at dawn on October 5th in a S.E. wind, force 3 to 4, with local thunderstorms.

Vanessa atalanta L.: At noon on October 7th, three [see Section (1), (60) above]. They were flying S.S.E. "like coasting birds".

Agrotis saucia Hübn. and *Phlogophora meticulosa* L.: One of each taken at dawn October 12th in off-shore wind. Also a *Bombus terrestris* female at 9 a.m. October 14th, flying S.W.

(4) *General Summary for 1935.*

Vanessa cardui: About 500 reported, compared with 200 in 1934. There were 150 spring records amongst the former. The first migrant was seen going north from Round Island, Scillies, on March 5th (last year, Hastings, April 11th). The last record was of about a hundred at Eastbourne on October 29th. Northerly migration was observed up to August 5th, including the Hebrides on July 20th; but no southerly return was witnessed in flight. The range included the north of Ireland and the Solway Firth (June 22nd); but a specimen was also taken in Finland (lat. 66° 16' N., long. 29° 54' E.) on July 3rd, although there were no Scottish records before September 27th at Wick.

Vanessa atalanta: Over a thousand reported (500 in 1934), including 100 spring records, of which perhaps 20 may have hibernated. A specimen was under observation from November to April in Flamborough Church, Yorks (C. W. V. Gane). About a hundred appeared at Eastbourne, October 28th and 29th, and the last was seen at Hastings on November 6th. Northerly migration was observed between March 13th and June 30th; and a southerly return between September 8th, Swindon, and October 28th, Hastings (see section (1) above). There was a significant increase in numbers present noticed along the south coast between September 20th and October 29th following previous scarcity. The range included the whole British Isles, though scarce in many places where very abundant in 1933.

Nymphalis io L.: The control insect was not so generally observed as might be expected, and was apparently below average generally. Wasps and birds made havoc with larvae. A new brood, which appeared in Abbot's Wood, Hailsham, on July 28th spread to gardens, deserting the woods a fortnight later. None recorded in N.E. England.

Colias croceus: About 750 reported (compared with only 75 in 1934), including a small proportion of ab. *pallida* and v. *helice*. It first appeared at Sandown, Isle of Wight, on June 13th, and was last seen at Folkestone on November 5th. A northerly movement was witnessed in the Isle of Wight in August, and there was a concentration of about 200 in lucerne fields near Thorpe Bay, Essex, up to the end of September. It ranged to the Isle of Man (September 6th to 8th) and Ayr (July 7th), and many were recorded in Scotland in September.

Colias hyale: Although 60 were reported in 1934, it was absent in 1935 save for a single male taken near Southend, Essex, on September 12th (T. P. Harris). At Bayonne, S. France, also, only one specimen was seen, on April 11th (Guy T. Adkin).

Acherontia atropos: Fifteen moths recorded, the first at Great

(5) *Comparative Estimates of Abundance in 1935.*

Although some county recorders have not yet sent in reports on the season there are in hand 800 record cards for 1935, as compared with 500 for 1934, upon which to base an estimate in the French numerical scale. (VC represents present in hundreds, C in dozens, FC more than 10 together, FR a few occasionally, R rare, VR specimens not every year, *nil* none seen though watched for. An asterisk denotes "very local", and the plus and minus signs denote whether distinctly above or below average years respectively.) The estimated abundance cards received are meant to show the maximum in the area at any one place and the areas are separated, like the Naturalists' Unions: east and west roughly divided by a line from the Needles to the Pennines, and north from the south of England by a Midland belt between latitude 52° and $53\frac{1}{2}^{\circ}$ N. It should be noted that these abundance estimates are useless for analysis. For the latter purpose only the standard record cards should be used, as the graphs are plotted for each species in each year on the basis of the number of insects seen on each day per observer situated in each degree of latitude in the British Isles, with rose arrows denoting the direction of flight when definitely stated. Examples of the graphs already completed have just been published in the *South-Eastern Naturalist and Antiquary* for 1935, vol. xl, in a report by Mrs. Grant, of Rothamsted Experiment Station, on *C. livornica* 1931, *V. cardui* 1933 and *P. gamma* 1934. Others are in preparation.

TABLE OF COMPARATIVE ESTIMATES OF ABUNDANCE IN 1935.

Species.	England and Wales.						Scotland. Ireland.	
	S.W.	S.E.	W.	E.	N.W.	N.E.		
<i>Vanessa cardui</i>	FC	C*	R—	FR	FR	R—	FR	C*+
<i>V. atalanta</i>	C	C*	FC—	FC	FR	FR—	FC	FC
<i>Colias croceus</i>	C*+	C*+	<i>nil</i>	R	FR	R	R+	R
<i>C. hyale</i>	<i>nil</i>	R*—	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>	<i>nil</i>
<i>A. atropos</i>	R	R	R	FR—	<i>nil</i>	R	R	<i>nil</i>
<i>H. convolvuli</i>	R	FR*—	<i>nil</i>	FR	R	R	?	R—
<i>M. stellatarum</i>	FC*—	FR—	FR	R—	<i>nil</i>	R—	FR	R—
<i>Plusia gamma</i>	VC*+	VC*+	C*	C*	FC—	FR—	<i>nil</i>	C—
<i>N. noctuella</i>	FR	FR	FR	FR	FR	<i>nil</i>	<i>nil</i>	<i>nil</i>

LATE APPEARANCE OF *P. BRASSICAE* LARVA.—To-day, November 27th, 1935, I found a perfectly normal, fully-grown caterpillar of *Pieris brassicae* feeding in the open on a Brussel sprout plant. The peculiarity of this case is that there have been lately some quite severe frosts. I am keeping the larva to see if it pupates and produces anything peculiar next spring. On the other hand, there has been here a great dearth of *Cheimatobia brumata*. I have never seen so few before. It is probable that vast quantities of the larvae were killed by the exceptional mid-May frost of this year.—B. TULLOCH (Brig.-Gen.); Hill Court, Abergavenny.

SYMMETRY IN THE WING-PATTERN OF SOME
PAPILIONID BUTTERFLIES.

BY B. N. SCHWANWITSCH.

I.

THE phenomenon of symmetry in the wing-pattern of Lepidoptera was independently discovered by several authors. Whiting noticed it in 1919 in his genetical studies on the Mediterranean flour moth *Ephestia kühniella* (1). Without being aware of his record I described in 1924 the prototype of the wing-pattern of Nymphalids and allied families of Rhopalocera in which symmetry plays a considerable rôle (2). Without knowing my work Süffert independently established in 1926 and 1927 (4) the fact of existence of symmetry in the above Rhopalocerous families and also in Heterocera. Later on several other authors, as Kühn, Menke, Koehler, dealt with symmetry in their numerous works on the wing-pattern both comparatively and experimentally.

It is known that the concept of symmetry in the wing-pattern of Lepidoptera is peculiar. The axes of symmetrical structures are not convergent with that of the body. The pattern components may show symmetrical arrangement with regard to a centre or line located in some definite area of the wing, so that right and left wings may have their own symmetrical systems, which are, however, in their turn symmetrical to one another.

There are several forms of symmetry in the wing-pattern, but undoubtedly the most interesting of all is that exhibited by the medial band or medial system (central system of German authors), which consists of two or more stripes arranged in symmetrical pairs about an axis coincident with the length of the discal vein. The most salient peculiarity of this system, owing to which it has been so long overlooked, is the fact that the two members of a pair differ considerably from one another, both in shape and size (owing to the narrowing of the wing towards its base), and only the position and structural characters of the stripes in question establish their symmetry beyond doubt. The system of medial stripes has been recorded in a great many groups of moths, including Microlepidoptera (*Ephestia*), and represents one of the most typical features of the Nymphaloid families. In the latter, however, the prototypical symmetry is very often suppressed, either through the disappearance of one of the stripes of the pair, or through the modifications of one of the stripes being widely different from those of another. Nevertheless in Satyrids and Nymphalids the symmetrical condition of the mediae is not infrequent. Typical forms of it may be also

seen in some Erycinids, which was already noticed by Süffert (1929) (5).

Now the family of Papilionids represents one of the largest groups of the Order, and the colour pattern of some of its members is amongst the most remarkable external phenomena displayed by any creatures. Eimer's attempt (6) to reduce the numerous wing-patterns of *Papilio* to the eleven stripes of *Papilio alebion* cannot be regarded as successful, and, practically, we have at present nothing for Papilionids that would correspond with the established Nymphaloid prototype. A preliminary study of Papilionids in the collection of the Academy of Sciences in Leningrad has shown me that any Papilionid prototype that might be elaborated would differ much from the Nymphaloid one, as a number of phenomena apparently not occurring in the latter group are met with in the former. But on the other hand the two groups have some characters in common, and among them the existence of a pronounced symmetrical system of mediae is the most important. Süffert in his memoir of 1929 (7) mentions the symmetrical stripes of *Thais** which may dissolve into series of rings (p. 374), and in his description of the dislocation of a pair of stripes in *Papilio podalirius* (8) he admits that they are possibly homologues of the symmetrical mediae without, however, especial proofs of this. These remarks made in passing are not sufficient, of course, for the elucidation of the problem, and I have examined specimens of several Papilionid genera with a view to ascertaining the existence of the symmetrical system of mediae in the family. As may be seen in Figs. 1-3, the result is undoubtedly positive, with one substantial restriction however.

II.

Fig. 1 represents the hind-wing underside of *Hypermnestra helios*. The two stripes designated first and second mediae (M^1 , M^2) cross the middle area of the wing. The totality of the area enclosed between them is markedly darkened so that the whole appears to be a single broad band, the darkening being especially pronounced at the margins, *e. g.* in the 1st, 2nd and 3rd cells at M^1 and in the 7th one at M^2 . The vein closing the discal cell lies between M^1 and M^2 , nearer to the former. The symmetry of the mediae besides their position manifests itself first in the above darkening and secondly in the shape of their cell-portions, which are concave and convex with regard to the wing basis in M^1 and M^2 respectively; or, taking the medial band as a whole its cell-portions may be termed biconcave with regard to its bisecting line.

The symmetrical character of mediae is still more pronounced in

* The correct name of this genus is now *Zerynthia*.—Ed.

Seriginus telamon (Fig. 2). Its stripes M^1 and M^2 are considerably darker than the area enclosed between them, and, being sharply cut on their outer sides, they lighten gradually towards the middle of the medial band. The latter circumstance renders their symmetrical structure very evident. The same is also proved by their

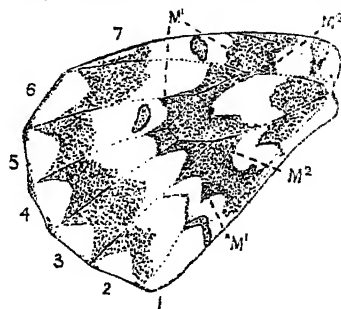


FIG. 1.—*Hypermnestra helios* Mén. Underside of hind wing. M^1 , first media; M^2 , second media: the two forming together the medial band. 1–7, numbers of marginal cells.

shape, which is just the opposite of that of their homologues in *Hypermnestra*, i. e. M^1 cell-portions are convex and those of M^2 concave, or the cell-portions of the medial band as a whole are biconvex. The band is nearly interrupted in the 1st cell owing

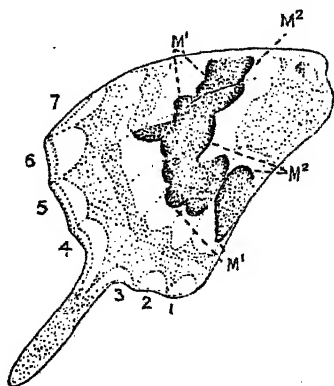


FIG. 2.—*Seriginus telamon* Don. Underside of hind wing. For letters see Fig. 1.

to a local constriction, which fact again demonstrates the symmetry of M^1 and M^2 . Similar constrictions have been described by me in the medial system of *Prepona* (9) and *Melanargia** (10). In the 5th cell of *Seriginus* the tongue-like protrusion of M^1 should be also noticed.

* The correct name of this genus is now *Agapetes*.—ED.

Finally in *Thais cerysii* (Fig. 3), the medial band is not less pronounced than in the two preceding forms. The fact is that its 7th cell-portion has broken off from the rest, and undergone a strong basipetal dislocation. But almost exactly the same dislocation, though without division, may be seen in *Hypermnestra* (Fig. 1), this difference between the two genera being evidently due to a

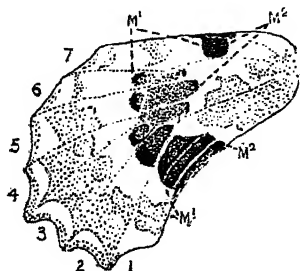


FIG. 3.—*Thais cerysii* God. Underside of hind wing. For letters see Fig. 1.

greater elasticity of stripes in the latter. The structure of the medial band of *Thais* is obviously symmetrical. Its cell-portions are mostly biconvex like those of *Sericinus*, while in the area of the discal cell there are three biconvex portions whose outer halves lie in the 6th and 5th cells, that of the 4th one being absent. On the other hand the coloration is again symmetrical, *i. e.* dark on the periphery and markedly lighter in the middle of the band. In the discal cell this difference is more pronounced than in any other.

III.

The described facts suffice to show that on the hind wings of three genera of Papilionidae there are two stripes which in their position, shape and other properties correspond undoubtedly with the symmetrical system of the first and second mediae existing in Nymphaloid families and a number of other groups of Lepidoptera. Other Papilionid genera have not yet been thoroughly investigated by me, but none of them seem to possess so good a representation of the medial system. This is, however, rather unimportant, as the family of Papilionidae is undoubtedly natural, and most likely the patterns of higher genera and of *Papilio* itself may be derived from those of primitive ones like *Sericinus* or *Thais*.

Much more important is the fact that the fore wings of the three genera studied do not show any trace of the medial system similar to that of their hind wings. There are a couple of stripes in the fore wings of *Sericinus* and *Thais* which pass symmetrically by the discal vein, but some reasons, not to be discussed here,

prevent me at present from homologizing them with the undoubted mediae of the hind wings. The resultant condition recalls the *Argynnis* form of Oudemans' phenomenon (11), which occurs in many Satyrids and Nymphalids, and is often accompanied by the disappearance or strong modification of the mediae of the fore wings, while on the hind wings these stripes retain a much more prototypical condition. This difference between the fore and hind wings of primitive Papilionids is one of the main difficulties to be overcome before the construction of the prototype of Papilionid patterns is rendered possible. But whatever the latter may prove to be, it is beyond question that the Nymphaloid, or rather the universal lepidopterous symmetrical system of mediae, will represent one of the fundamental parts of its hind-wing half.

The existence of the medial system is undoubtedly a generalized condition. This may be concluded first from its occurrence in a great number of distantly related groups of Lepidoptera; secondly from its generally greater rôle in Heterocera than in Rhopalocera, the former group being seemingly more highly specialized in the colour patterns than the latter; and thirdly from the fact that in the evolution of the wing-pattern of Nymphaloid families, which, if but incompletely, is at present better studied than that of any other group of Lepidoptera, the symmetry of the medial stripes plays but comparatively seldom an important rôle, while the majority of the most interesting evolutionary processes are accompanied by the suppression of this phenomenon. But in the establishment of prototypes of the wing-pattern its great importance is beyond question, and its presence in so highly specialized a family as Papilionidae is of much interest.

SUMMARY.

In the hind wings of *Hypermnestra*, *Sericinus* and *Thais*, three genera of Papilionid butterflies, there are two transverse stripes that form a symmetrical system undoubtedly homologous to the medial system of Nymphalids and allied families, and of a number of Heterocerous groups. The presence of this primitive system in the highly specialized family of Papilionidae is important. On the other hand, no undoubted medial system has been discovered in the fore wings of these genera.

REFERENCES.

- (1) WHITING, P. W.—*Journ. Exp. Zool.*, xxviii, 1919.
- (2) SCHWANWITSCH, B. N.—"On the Ground Plan of Wing-pattern in Nymphalids and Certain Other Families of the Rhopalocerous Lepidoptera," *Proc. Zool. Soc. London*, 1924.
- (3) KÜHN, A.—"Über die Änderung des Zeichnungsmusters von Schmetterlingen durch Temperaturreize und das Grundscheina der Nymphalidenzeichnung," *Nachr. Ges. wiss. Göttingen Math.-Phys. Kl.*, 1926.

(4) SÜFFERT, F.—"Zur vergleichenden Analyse der Schmetterlingszeichnung," *Biol. Zentr.*, xlvii, 1927.

(5) *Idem.*—"Morphologische Erscheinungsgruppen in der Flügelzeichnung der Schmetterlinge, ins besondere die Querbindenzeichnung," *Arch. Entwicklungsmech.*, 120 : 1929.

(6) EIMER, TH.—*Orthogenesis der Schmetterlinge*, 1897.

(7) SÜFFERT, F.—1929, *l. c.*

(8) *Idem.*—1927, *l. c.*

(9) SCHWANWITSCH, B. N.—"Studies on the Wing-pattern of *Prepona* and *Agrias*, Two Genera of South American Nymphalid Butterflies," *Acta Zool.*, xi, 1930.

(10) *Idem.*—"Evolution of the Wing-pattern in Palaearctic Satyridae : II, Genus *Melanargia*," *Zeitschr. Morph. Oekol. Tiere*, xxi, 1931.

(11) *Idem.*—1931, *l. c.*

Entomological Laboratory,
University of Leningrad.

MANIA MAURA IN SAND MARTIN'S NESTS.—In reply to Mr. C. Nicholson's query *re* the finding of *Mania maura* in Sand Martins' nests, I would like to state that in August, 1894 or 1895, I was getting out of a boat on the banks of the river Lagan above Belfast and noticed some nests in the banks. I casually looked into one and saw some dark objects which proved, on examination, to be specimens of *M. maura*. I examined other nests and found numerous specimens. The insects were at rest on the sides of the passages leading to the nests, a few inches in from the entrance. At the time probably most of the birds had left the nests, so that the moths would not have been disturbed. I forget now if the nests in which the moths rested were old ones or not.—M. S. D. WESTROPP; Dublin, November 1st, 1935.

PLUSIA GAMMA AT HASTINGS.—In view of the extraordinary exodus of the Silver Y Moth in myriads reported from the Start Lighthouse, S. Devonshire, on the night of August 4th (*Entom.*, 68 : 209 (35)), Mr. H. Graeme Macleod, of 52, London Road, St. Leonards-on-Sea, has sent in a complete list of his counts made nightly between 11.30 p.m. and 1.30 a.m., with only eleven dates unrecorded, from June 25th to October 30th, from which the following data are extracted: Seen swarming in hundreds near lights on the same stretch of sea-front at Hastings on July 4th, August 6th-7th and 21st; ditto, *Plusia gamma* seen in dozens on the following dates: June 26th-28th, July 2nd-7th, 10th-11th, 14th-24th; August 2nd-10th, 13th-16th, 18th-28th; September 1st, 5th, 8th, 27th; October 28th only. On certain nights under shelter the species was either entirely absent or few specimens seen, viz. July 12th; September 2nd-3rd, 7th, 9th-10th, 13th-17th, 22nd-26th, 28th-30th; October 5th-6th, 10th-11th, 13th, 15th, 17th-23rd, 26th, 29th-30th. Otherwise Mr. Macleod only recorded a few specimens flying by day at Peasmarsh on July 17th, and saw them flying in dozens at Wannock, East Sussex, on July 28th. (Note: The observations credited to H. G. Marsh in *Entom.*, 68 : 255 and 257, should be amended to read H. G. Macleod).—T. DANN-REUTHER (Capt.); "Windycroft," Hastings.

A NEW KASHMIR CADDIS FLY (TRICHOPTERA).

BY MARTIN E. MOSELY, F.R.E.S.

Stenophylina gen. n.

Maxillary palpi with the basal joint about half the length of the second, which is equal to the third; antennae long and stout; basal joint large and rounded; next joint very short; third longer, about two-thirds the length of the basal joint and longer than the following joints. Anterior wings broad; costal margin rounded; radius bent towards its apex nearly to meet the sub-costa: forks 1, 2, 3 and 5 present, all sessile; discoidal cell long and narrow; cellula thyridii long and narrow, extending towards the base beyond the cross-vein joining the cubitus and the first anal vein.

Posterior wing with forks 1, 2, 3 and 5 all sessile; there is a well-developed frenulum situated on the basal half of the costa, consisting of very long fine hairs; anal area produced in a large triangle; discoidal cell long and narrow.

Spurs 1, 3, 4. For genital characters, reference should be made to the description of the single species *mitchelli*.

Genotype: *Stenophylina mitchelli* sp. n.

The genus is evidently related to Martynov's *Pseudostenophylax*, having regard to the genitalia, but the posterior wing lacks the pouch with the specialized hairs or scales which is so characteristic of that genus.

Stenophylina mitchelli sp. n.

The two examples of this species are both mounted as balsam preparations. The wings are large and brown and the insects bear a general resemblance to species of the genus *Pseudostenophylax*, but the costal margin of the anterior wing is far more rounded, and the very extraordinary development of the anal region of the posterior wing renders this insect amply distinct from the *Pseudostenophylax* species. The general characters are given in the description of the genus.

Genitalia.—♂. The margin of the terminal dorsal segment is produced at its centre in two large rounded lobes closely set with minute black setae and with a deep excision between; superior appendages small and narrow; intermediate appendages from above broad and triangular, inner angles produced in strong black teeth directed upwards, apical angles also blackened; from the side the apical angle appears as a short, slightly curved spur and the inner angle as a well-developed and much larger black upwardly-directed tooth. Penis from above, long, dilated slightly at the centre, apex rounded; from the side it curves slightly downward with a truncate apex. Penis sheaths long and membranous, apices

furnished with long bristles or teeth. Inferior appendages very broad, nearly quadrangular, apices truncate with the outer apical angles slightly produced; from the side the appendage is rather narrow with a concave upper margin and acute apex; the margin of the terminal ventral segment produced slightly at its centre.

Length of anterior wing, ♂, 16 mm.

Kashmir, Lake Vishensar, 12,000 ft. F. J. Mitchell.

Type ♂ and paratype ♂ in the British Museum (Nat. Hist.), both mounted as balsam preparations, one pair of wings of the type mounted dry.

I dedicate this species to the memory of the late F. J. Mitchell, to whom is due the introduction of trout into Indian waters, and who took a keen interest in the entomology of Kashmir in its relationship to trout food.

NOTES AND OBSERVATIONS.

SPHINX CONVOLVULI IN SUSSEX.—Two female *Sphinx convolvuli* were captured by my brother, Mr. P. Brett, and myself at Etchingham, Sussex, on September 18th and 21st this year. The time in each case was about 11 p.m., and both were caught while feeding at Tobacco flowers. On September 18th a fresh S.W. wind was blowing—the tail end of the gale—and the temperature was 58° F. On September 21st there was practically no wind, and the night felt warmer, though the temperature was not taken. Both moths were in good, though not quite perfect condition, and when dissected for stuffing purposes the ovaries appeared to be not fully developed. The largest eggs were quite small and soft, and there was a large amount of fat-body present. I don't know whether these last points are of interest from the migration point of view, but I include them in case they are.—G. A. BRETT; Brambles, Etchingham, Sussex.

GONEPTERYX RHAMNI IN NOVEMBER.—In the *Entomologist*, 1929, 62: 17, I recorded the late appearance of *G. rhamni* on October 21st, 1928, at Sutton, Surrey, being then the latest date I knew for this butterfly to be on the wing. I am now able to record the appearance of a male seen on the wing by my brother on November 3rd last at Watermeads, Mitcham, Surrey. It is well known that *rhamni* usually enters into hibernation shortly after emergence at the end of July, August or early September, and seldom is one seen until after hibernation, generally in March, but a warm day or two in either January or February is apt to cause one to take wing in the sunshine; yet I know of no other instance of one being seen on the wing in November.—F. W. FROHAWK; November, 1935.

THECLA QUERCUS CONGREGATING AT HAWTHORN.—On July 30th last, 3 p.m., summer time, when collecting near Bookham, Surrey, I happened to strike a small hawthorn bush, causing about a dozen *Z. quercus* to fly from it. I therefore decided to keep watch,

and, after about three minutes had passed, a single butterfly was seen to alight on the bush, followed shortly after by others, to the number of about thirty. Upon examining the bush I discovered that the Hairstreaks had settled in rows near the bases of three branches. Upon striking the bush the butterflies flew away, but almost immediately commenced to return. My visit was repeated about every fifteen minutes until 6 p.m., and on each occasion the procedure and results were the same, with the exception that after 5 o'clock the insects were in greater numbers and more difficult to dislodge, apparently becoming lethargic. There appeared to be no exudation from the tree and no butterfly was detected in the act of feeding, but all remained motionless with their wings closed over their backs, the assumption being that the insects had found in this bush an attractive resting-place. Of those which were captured, 12 males and 8 females, all were in poor condition. No other species of insect was attracted. I shall be pleased to indicate this tree to anyone living in the vicinity of Bookham who cares to keep it under observation during next season.—A. A. W. BUCKSTONE; 90, Pams Way, Ewell, Surrey.

MACROGLOSSUM STELLATUM IN OCTOBER.—A specimen of this moth came into the house on October 11th.—H. M. EDELSTEN; Balcombe, Sussex, October 22nd, 1935.

HIPPOTION CELERIO IN SURREY.—On November 5th my son found in Purley, Surrey, a live specimen of the Silver Striped Hawk Moth—*Hippotion (Chaerocampa) celerio*. The moth is a male, and in such perfect condition that it must have only just emerged.—J. C. GARRATT; Newick Cottage, 75, Old Lodge Lane, Purley, Surrey, November 11th, 1935.

ARCTIA CAIA IN THE AUTUMN IN CORNWALL AND DEVON.—In the *Western Morning News* of November 5th a correspondent records that a fine female of this species was brought to him from a wall at Dartington on which it was found freshly emerged. On October 18th I had a worn female specimen given to me in a small tin, in which it had laid about 340 eggs. It was found on the floor of his office shed a few days before by the manager of the Cornwall County Council's depot by the river at Tresillian. This species seems rare here. These specimens are examples of the rare second brood, and it will be exceedingly interesting if the eggs hatch, in view of the unlikelihood of their being fertile. Should they do so I will report the fact.—C. NICHOLSON; Tresillian, Cornwall, November 14th, 1935.

SWARMING OF THAUMETOPOREA PITYOCAMPA (LEP.).—One day in August, 1930, while in the woods at Freiriz, near Braga, in Portugal, I was watching a kestrel feeding a young bird on the top of a pine tree with lizards, which it always brought hanging by the neck, when my attention was drawn to a nuthatch running up and down another pine near by. Suddenly I was surprised to see it rise quickly

in the air and fly most erratically round the top of a very tall pine in the vicinity. For a long time I could see no apparent reason for such behaviour, even though I was using a good pair of binoculars, until, having moved round to another position with the sun at my back, I could plainly see a large swarm of *Thaumetopoea pityocampa* Schiff. in what appeared to be their nuptial flight. The larvae of this moth live in common nests on the pine trees, chiefly *Pinus maritimus*, and when full fed go down to the earth all together, where they pupate *en masse*. In captivity I have found that the moths come out almost all at the same time, but have never been able to observe if the same principle holds good in nature, although many times in Gerez, while catching butterflies in the daytime, I have been surprised at what looked like a shower of *T. pityocampa* falling down from the tops of the trees. Is it possible that copulation takes place while in the air or on the tops of the trees after flights similar to the one I witnessed in Freiriz? In any case it is interesting to note that the nuthatch was undoubtedly feeding on the moths, of which it must have caught quite a good number during the time I watched it.—J. T. WATTISON; Rua da Circonvalacao, Senhora da Hora, Portugal.

AGROTIS CINEREA OCCURRING INLAND.—In reference to Mr. C. G. M. de Worms's note as to *Agrotis cinerea* being generally associated with chalk hills or coastal areas (*Entom.*, 68: 233), I may mention that I have specimens from Cranborne near Salisbury. These are of a curious brownish colour, presenting quite a contrast to the slate-coloured specimens from the Sussex Downs.—HUGH J. VINALL; 1, Park Road, Lewes, October 14th, 1935.

LOXOSTEGE PALEALIS.—On August 12th this insect was common in a field of *Daucus carota* on the South Downs. Over a dozen specimens were kicked up in a few minutes. It seems rather a difficult species to breed. I had twelve cocoons from larvae collected in Dorset and Sussex in 1934, and only eight produced imagines. At the end of August, 1935, I opened the remaining cocoons; one had a dead pupa in it, another a dead larva, while the two others still contained living larvae, which have since spun up the opening I made, and are apparently going over another year. The cocoons were kept out in the open the whole winter and at times must have got very wet. Buckler (9: 160) mentions finding a living larva in a cocoon a year after it had spun up. The larvae were abundant again this year.—H. M. EDELSTEN; Balcombe, Sussex.

UNUSUAL FOOD-PLANT OF SESIA CYNIPIFORMIS.—I found a number of Sesiid larvae this spring feeding gregariously under the bark on the boss of a black poplar. Rather to my disappointment on emergence they proved to be the ordinary oak-feeding *S. cynipiformis*. I have already recorded this moth as feeding on birch

and Mr. J. C. F. Fryer on elm, but poplar seems a wide extension of its feeding range. The specimens bred were about the average size.—H. C. HUGGINS; 875, London Road, Westcliff-on-Sea.

LEPIDOPTERA IN WEST CORNWALL.—The following among other species were seen in the Lizard district between June 15th and July 6th, 1935: *Colias croceus* and *Vanessa cardui* singly all round the coast. *Vanessa atalanta*, five in poor condition on one patch of red valerian near Coverack (June 27th). *Euphydryas aurinia* in small numbers in several localities as late as July 3rd. *Argynnis selene* generally distributed and common. *A. aglaia* not seen until July 5th. *Plebejus argus* just emerging near Kynance Cove on July 3rd, a month later than at Land's End in 1934. *Lusioecampa trifolii*, several full-grown larvae near Mullion. *Eriogaster lanestris*, webs of larvae common near Coverack. *Macroglossum stellatarum* and *Sphinx ligustri* at Cadgwith. *Arctia villica* near Lizard Point. *Agrotis lunigera* fairly common at sugar on a rocky headland near Mullion; it came late, well after dark, unlike *A. exclamatoris*, which swarmed at dusk (first seen June 26th). *Xanthorhoe galiata* and *Anticlea rubidata* frequently beaten near the coast. *Nemoria viridata* common and generally distributed on the moors, where *Ematurga atonaria* was abundant; blackish examples of the latter were taken. *Diacrisia sanio* and *Agrotis strigula* were also seen on the moors. Sugar was productive on the coast near Mullion in spite of sea mist and generally cool nights. Species noted included *Agrotis corticea*, *A. ypsilon*, *A. saucia*, *Acronycta rumicis*, *A. psi*, *Hadena pisi*, *H. adusta*, *Mamestra contigua*, *Dianthoecia capsicola* and *Pyrrhia umbra*.—S. B. HODGSON; 22, Charles Street, Berkhamsted, Herts, October 20th, 1935.

TRIGONA IN THE CAROLINE ISLANDS.—I have just received from Prof. K. Yasumatsu, of the Kyushu Imperial University, a quantity of small *Trigona* bees collected by Prof. T. Uchida, February 17th, 1934, on Palau (Pelew) Island. I hoped to see an endemic species, but they are *T. atomella* Ckll., 1919, known from Penang and Siam, evidently introduced into the Carolines.—T. D. A. COCKERELL.

ODONATA IN KENT.—On a recent visit to Kent, July and August of last year, 1935, in which I paid special attention to the Odonata, I was very much interested to find that *Orthetrum cancellatum*, which Lucas appears to regard as a rare species, was quite abundant in the eastern corner of the county. I found it at Deal, Sandwich, Canterbury, and in especial abundance in a village not far inland from Sandwich, which I made my headquarters. On a largish pond near the village *O. cancellatum* could be seen in dozens, and a favourite haunt was a path through a cornfield about half a mile from this pond. The males were in the habit of sunning themselves on this footpath, and especially on heaps of dried dock and nettle which occurred at intervals. The females seemed to prefer to sit on the ripe corn-stalks fringing the fields. Both were hard to capture, especially the females.

The males would move warily from point to point along the path just in advance of the intruder, but the females generally took alarm at once and darted away across the adjoining fields. Lucas says "the latest record for the species appears to be July"; but I saw several individuals in August, on the 7th day of which month I took (and liberated) a male with very ragged wings, but also a perfect female, whose light tint suggested that she had but recently emerged. Still more interesting, I think, than this information about *O. cancellatum* is the fact that I took a specimen on July 10th of *Libellula fulva*. I did not recognize it, as it was on the same field path as the specimens of *O. cancellatum*, and (being a male) almost exactly resembled them. It was only when in the cabinet that it was pointed out to me that the black bases to the lower wings and the slight cloud at the edge of the upper ones marked it as *L. fulva*. There is no doubt whatever that it is *fulva*. Lucas, it will be remembered, says of *fulva* that "recorded captures may almost be counted on one's fingers". He gives two records for Kent—"a female at Kingsdown, near Deal, in 1881 (C. G. Hall): a rather worn adult male near Sandwich on August 22nd, 1898 (W. J. L.)". Here is a third record from the Sandwich district, July 10th, 1935.—(Rev.) J. G. GILLMAN; St. Andrew's Vicarage, Leicester.

AN UNUSUAL NEST OF A LEAF-CUTTER BEE.—I have always understood that the nests of the "leaf-cutter" bees, of which we have some half-dozen species in this country, were made in holes, in walls, or wood, or in the earth, bored by themselves, or found ready for occupation by the lucky ones. I was therefore much surprised to find one hanging free from a beam on the side of an inner wall of a shed. I had observed the bee going in and out during the summer, and noticed that it always disappeared behind a paper parcel lying on a narrow shelf near the top of the shed. I took no further notice till a few days ago, when, on going to find out just where it had nested, I was amazed to see it hanging as described, between the wall of the shed and the paper parcel, attached only by the end or first cell. It looked very like a long thin and somewhat roughly rolled cheroot. Most of the pieces of leaf were still quite green. It measured 14 cm. in length and 1 cm. in diameter, and consisted of nine cells. Some of these I opened, and in two of them found a number of small grubs, which Mr. Riley informs me are those of a Chalcid parasite. I hope later to be able to send him the imagines of both the bee and the parasite for identification. The bee is probably *Megachile centuncularis*; it will, however, be of interest to make sure on account of the abnormality of the manner of its nesting.—J. E. CAMPBELL-TAYLOR; "Afterwards," Dudsbury Cross, near Wimborne.

DIPTERA IN DUMFRIESSHIRE.—Some interesting flies taken recently, chiefly in the Greta district, include the following: *Simulium morsitans* Edw. is not rare on sleepers by the railway-side at Springfield, and odd examples on a peat moss. *Dilophus febrilis*

Lin., common in May and again in August. Sometimes in immense numbers on alder and birch bushes. *Bibio johannis* Lin. and *B. marci* Lin. are both abundant. *Culicoides pulicaris* Zett. is an intolerable nuisance when collecting on the mosses in the evening. It is not confined to such localities, however, as I have taken it on windows and in the garden. It rejoices in the local name of "Hell Sweep". *Anisopus fenestralis* Scop. is frequent on windows, but also occurs in meadows and by hedgerows, in which latter habitats *A. punctatus* Fab. is frequently met with. *Microchrysa flavicornis* Mg. is sometimes abundant on birch trees in summer. *Atherix ibis* Fab., one female beaten from broom near Springfield in May. *Empis stercorea* Lin. and *E. trigramma* Mg. are both common. They seem to frequent moist locations and are most plentiful about midsummer. *Tachista arrogans* Lin. is to be found almost everywhere. It is a fly which seldom or never flies, but can run very rapidly. I have found it under stones, logs, etc. *Tachydromia minuta* Mg., frequent in the sweepnet while working along hedges in June and July, and *T. agilis* Mg. occurs in similar situations, but is about rather earlier. *Dolichopus plumipes* Scop. is common on our peat mosses. All my specimens bear dates in June. *Pipunculus confusus* Verr. I have taken in June, but it is rare. *Liogaster metallina* Fab., not rare on Newton Moss from June to August. *Chilosia maculata* Fln.: I took a single example at Canonbie on June 2nd. *Platychirus manicatus* Mg. is very common. I have taken it at willow bloom in April. *P. peltatus* Mg. *P. albimanus* Fab., and *P. clypeatus* Mg. are common at flowers and frequently visit gardens. *Ischyrosyrphus glaucius* Lin. is rare. I have only taken it singly from Umbels in July and September. *Rhyngia campestris* Mg., generally so common, has been quite rare this year (1935). *Syrphus cinctellus* Zett. not rare. I have it from Nutberry Moss in July. I have also taken it on house windows and at flowers. *Pollenia rudis* Fab., common. I have taken this species at willows in April and swept it from heather in October. *Musca domestica* Lin. is by no means common here, our most abundant house-fly being *Fannia canicularis* Lin., with *Stomoxys calcitrans* Lin. sometimes to keep it company. *Amaurosoma fasciata* Mg. is not uncommon in grassy lanes in May. *Norellia spinimana* Fln., fairly frequent in the sweepnet. I have met with it as late as September. *Tetanocera punctulata* Fab.: this fly, with its marbled wings, is not uncommon in grassy lanes; my latest date for it is September 2nd. *Psila rufa* Mg. is not rare along hedgerows. *Acidia heraclei* Lin.: I took a male and a female near Gretna in May. These were kindly determined by Mr. J. Collins. *Palloptera trimacula* Mg. is common along hedgerows from May to July. *Sapromyza rorida* Fln., very common in long grass. *Centor myopinus* Lw. is plentiful at Nutberry along the edge of a wood, and also in several other localities. *Borborus equinus* Fln. is abundant, and *B. geniculatus* Mcq. is almost as common.—JAS. MURRAY; 6, Burnside Road, Gretna, Dumfriesshire.

RECENT LITERATURE.

The Wasp. By W. B. R. LAIDLAW.

It is with a certain reluctance that we undertake to express opinion on this new contribution to the study of our native Hymenoptera. Our task would have been more agreeable had we been able to temper our criticism with unstinted praise. Unfortunately we are forced to recognize that Dr. Laidlaw's book possesses neither originality nor any aptitude to correlate his observations and conclusions with established facts.

The work is devoted primarily to a systematic study of the British social wasps belonging to the group known as the Vespinae. Of the three castes, male, female and worker, produced by these insects, the author singles out the male for special attention. Coloured drawings are given of this sex, and the genitalia are figured. The former leave nothing to be desired as to their artistic excellence, but as an aid to the identification of species they are often grossly misleading. For example, the males of *Vespa vulgaris* and *Vespa germanica*, as represented, show structural differences which would exclude all possibility of confusion between them. Actually, they are so much alike that only an examination of the genitalia will readily separate them. From the bibliography given at the end of the book it is evident that the author has not troubled to consult any of the more recent literature dealing with his subject. This is a pity, for otherwise he might have constructed better tables for the identification of our wasps. He has failed to offer satisfactory means of separating the female castes of *Vespa germanica* and *V. vulgaris*. The color differences he points out are insufficient and by no means reliable. The author adds brief notes concerning the habits of the different species he discusses, and it seems that he has some startling thing to say about *Vespa austriaca*. One gathers from his somewhat confused remarks that he is unwilling to accord it specific status preferring to accept it as an ancestral form of *Vespa rufa*. He informs us "that *austriaca* queens construct nests . . . beyond doubt". The evidence for this bold statement is not given, though Dr. Laidlaw says that he himself has been able to confirm it by discovering a single *austriaca* queen collecting nesting material from a weathered box on May 4th, 1933. He then goes on cautiously to state that investigations have suggested that *austriaca* queens may commence a nest and produce workers of typical *Vespa rufa* colouring with a proportion of males and females of both types. Incidentally it is well established that *V. austriaca* is a good species, and that it lives as an inquiline "cuckoo" in the nests of *V. rufa* and its varieties.

However, there seems little to gain in trying to disentangle from Dr. Laidlaw's confused and contradictory remarks concerning this wasp exactly what he would have us believe about it.

Apart from his discussion of *Vespa austriaca*, the author refrains—

and we add, very wisely—from describing in detail the habits of our social wasps. Nevertheless he has a few reckless assertions to make. *Vespa vulgaris*, he tells us, feeds on rubbish and offal, and is associated with inhabited districts to the extent of being possibly dependent upon man. In our experience the food of *V. vulgaris* is not essentially different from that of our other social wasps, and we have never observed it showing the least predilection for rubbish and offal. Nor have we detected in it any but an accidental interest in man.

Altogether we cannot help feeling that had Dr. Laidlaw postponed the publication of his paper for two or three years, he would have been able to clear up many of the points over which he is in unnecessary doubt both by direct observation and by a more adequate acquaintance with the appropriate literature. He might then have been able to make a really useful contribution to entomology. As it is he presents us with a work which none of us can take seriously.

G. E. J. N.

Die Blatt-minen Mittel- und Nord-Europas. By Prof. MARTIN HERING. Neubrandenburg: Gustav Feller; 's-Gravenhag: W. Junk. To subscribers, 12 RM.; non-subscribers, 18 RM. per part, less 25%.

In schools to-day botany is still the favourite branch of natural history chosen for study; the ease and cheapness with which an abundance of material for dissection can be provided will probably always give it an advantage over zoology in its wide sense. The field botanist cannot very well avoid noting the diseases and malformations that affect the plants he collects, and, stirred by curiosity, attempts to discover their causes. In the past the many excellent books dealing with the subject have stimulated interest in galls and gall-makers, and by this pleasant approach not a few botanists have become entomologists. We venture to hope that with the appearance of Prof. Hering's handbook of the *Leaf-miners of Middle and Northern Europe*, the first part of which has just been issued, another branch of the subject will become equally popular. This author has, during the past few years been issuing a *Herbarium of Leaf-miners*; eighteen fascicles, comprising 360 examples of mines found in the leaves of a wide variety of plants, have been "published" to date, a complete set being available for consultation in the Entomological Department of the British Museum (Natural History). Since 1920 he has been publishing extensive papers in various journals, the results of his labours on leaf-miners and their ecology, but this book will make the subject as a whole much more accessible to students generally; its issue as a pocket-book at a later date is promised.

Leaf-miners belong to four orders—Lepidoptera, Hymenoptera, Coleoptera and Diptera. Though small, and even minute, all the members are full of interest to the student, who may, in the case of the moths at least, also find considerable aesthetic pleasure in their study. Hitherto the lack of information in accessible form and the impossibility of getting most of the miners, either as larvae or adults,

determined, have been depressing factors, but the extensive rearing and the identification of the insects by Dr. Hering and his co-workers puts the study on a sound systematic basis. The assistance of Dr. Hendel in the Agromyzidae is freely acknowledged.

The first 25 pages of Part I are devoted, *inter alia*, to useful instructions for the rearing of the miners and the preservation of the mines, a consideration of the orders to which the miners belong, the description of three new species of *Phytomyza* and two new sawflies which have been recognized since the main part of the work went to press, and tables for the recognition of the members of the Tortricid genus *Cnephasia* allied to *wahlbomianu* and of the species of *Lithocolletis* found on Rosaceae. In the remaining 87 pages the mines occurring in the leaves of the botanical genera beginning with "A" down to *Bromus* are dealt with by means of dichotomous tables. These are concise, easily understood, and, where tested, have been found to be accurate; in a very short time the writer was able to classify some of his own undetermined material.

Botanists would appear to have their own nomenclatural difficulties; the intrusive *r* in *Bor(r)ago* and its family *Boraginaceae* and the *a* in *Barbar(a)ea* appear strange to the eye of one accustomed to the English floras. There are remarkably few miners without specific names—a point which speaks for the thoroughness of the work. The nomenclature, as was to be expected, is up-to-date; we shall have to get accustomed to seeing our old friend *Phytomyza lateralis* masquerading under the genus *Dizygomyza* (*Poëmyza*), and we have noted the polyphagous tendencies of *Phytomyza atricornis*; *Spilograpta zoë* has been transferred again to *Trypeta*, while we cannot help thinking that *Vidalia* may lead to confusion with the coleopterous genus *Vedalia*. Synonymy is treated adequately, and illustrations are clear.

The only objection—and it is one which neither the author nor the publisher could be expected to overcome—is the price of the work, which will require at least six parts for its completion. Even with the discount of 25% allowed at present for all German works, the cost may be considered beyond the means of many potential buyers. Without donning the cloak of the prophet, we feel that this work will, in due course, provide the groundwork for a small English book on leaf-miners, which will be sold at a price within the reach of the school-teacher, the nature student and even the boy scout who are anxious to add a collection of leaf-mines to their herbarium of plants and galls, and the adult miners to their store-boxes of insects.

F. L.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*July 25th.*—Mr. E. E. Symes, President, in the Chair.—Mr. S. Wakely exhibited specimens of *Telphusa alburnella* Dup. from near York, a species new

to the British Isles; Dr. Bull, a variable series of *Taeniocampa incerta* taken at Aviemore in April. Mr Hawkins exhibited and read notes on a short series of *Calocalpe undulata*, bred from ova laid by a Byfleet female. Mr. Eagles exhibited a series of *Dorcatoma flavicornis* (Col.) from a decayed oak with specimen of the probable parasite found with it (Hym.), a *Reduvius personatus* (Hem.), a predator on other insects, and larvae of *Boarmia punctinalis* (con-sortaria) from Bookham; Mr. Niblett, species of *Trypetidae* bred from flower-heads of *Aster trifolium*, *Hypochoesis radicata* and *Chrysanthemum maximum*; Mr. Coulson, many species collected by him at Field Meetings of the Society; Mr. Attwood, larvae and pupae of *Agdistis bennetii* from the Thames banks; the President, the aphid on plum leaves on which a Braconid larva was feeding. Preliminary Reports of Field Meetings were read by Mr. Hawkins and Mr. Attwood.

August 8th.—The President in the Chair.—Mr. Coulson exhibited the two rare and local Coleoptera *Attagenus trifasciatus* and *A. pello* var. *megatoma* taken in Finsbury, E.C.; Mr. Hawkins, series of *Philereme transversata* (rhamnata) bred from larvae from Boxhill, preserved ♀ larvae of *Orgyia gonostigma*, second brood, from Brentwood, larvae of a third brood of *Ptychopoda aversata* from Wimbledon, and larvae of *Euphyia cuculata* (sinuata) on Galium, Surrey; Dr. Cockayne, a preserved larva of *Calamia lutosa*, Hb. and read notes on its occurrence; Mr. Coote, ova of *Callimorpha quadripunctaria* (hera) from Devon.

August 22nd.—The President in the Chair.—Dr. Blair exhibited a photograph of a group of those who attended the Congress of British Entomology at Oxford in July, also he showed a nymph of *Centrotus cornutus* L. (Membracidae), and leaves of *Poterium sanguisorba* galled by *Eriophyes sanguisorbae* Nal. from Eynsford. Mr. Bliss exhibited grey-brown forms of *Hyloicus pinastri* L. from Dorset; Dr. E. A. Cockayne, an unusual form of the larva of *Cucullia asteris* Schiff. from Sussex; Mr. Jacobs, *Phthorimaea operculella* Zell., a pest of imported potatoes; Mr. Hawkins, bred examples of *Sterrha humiliata* from German larvae; Mr. Eagles, a brown form of the larva of *Pheosia tremula* (dictaea) from Bayford; Mr. Bunnett, the Homopteron, *Gargara genistae*, from broom, and *Cassida viridis* (equestris) (Coleoptera); Mr. Pinkey, aberrations of *Argynnis adippe*, of *Hypocrita jacobaeae* and of *Adopoea flava* (thaumas).

September 12th.—The President in the Chair.—Dr. H. King exhibited a very long series of *Mellinia ocellaris* bred from catkins of poplar from Suffolk; Mr. M. Niblett, galls caused by Coleoptera: *Apion loti* on seed-pods of *Lotus corniculatus*, *Miarus campanulae* in seed-heads of *Campanula rotundifolia*, *Gymnetron noctis* in seed-capsules of *Linaria vulgaris*, and *Ceuthorrhynchus pleurostigma* in roots of *Alyssum saxatile*; Dr. H. B. Williams, recently bred forms of *Abraxas grossulariata*, forms of *Polyommatus* (L.) *bellargus* and of *P. (L.) coridon* from the Isle of Wight, August, 1935, and a varied series of bred *Xanthia fulvago* from Esher, 1935; Mr. S. Wakely, the local

Crambus, *C. contaminellus*, from Upper Norwood, taken at 1 Mr. de Worms, larvae of *Caradrina ambigua* from Devonshire Coulson, long series of British species of *Rhyncophora* (Col.), to illustrate the paper he read on the family. Miss Brooke read a report of the Jubilee Meeting of the Dublin Naturalists' Field Club, at which she was present as the Society's delegate.

September 26th.—The President in the Chair.—Mr. W. J. Kaye exhibited an extremely fine melanic example of *Chiasmia clathrata* from the Isle of Wight; Mr. Niblett, the gall-forming *Orellia fulcata*, bred from roots of *Tragopogon pratensis*; Mr. E. E. Austen, eleven species of Coleoptera taken from a fallen beech trunk in Epping Forest, May, 1935; Mr. Andrews, the very rare Dipteron *Trypeta paleata* from the Isle of Wight. Mr. Wakely read a short paper on British Plume Moths he had recently met with. Mr. Downs read a short paper on A Phase in the Biological History of the Locust *Locusta migratoria*.—HY. J. TURNER (*Hon. Editor of Proceedings*).

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club was held at Friary Hill, Weybridge, on Saturday, September 26, 1935, Mr. H. Willoughby-Ellis in the Chair. Owing to the Entomological Congress at Madrid, a considerable number of the invited guests who were attending the Conference were unable to be present. Those present included: Mr. H. Willoughby-Ellis (Chairman), W. J. Kaye (member), Mr. R. W. Lloyd (member), Mr. H. E. Andrews, Major E. E. Austen, Dr. K. G. Blair, Mr. E. C. Bedwell, Mr. F. Frohawk, Mr. E. E. Green, Dr. S. A. Neave, Mr. W. Rait Smith, Mr. H. J. Turner. The guests were received by Mr. and Mrs. Willoughby-Ellis during the morning and luncheon was arranged for 1 o'clock, after which, in sunny weather, the company divided between the gardens and museum. The Chairman's collections of Lepidoptera, Coleoptera and Hemiptera were on view, and a very complete and varied collection of British Sphingidae attracted special attention, as also that of the Hemiptera. In so short a time only a small section of the Coleoptera could be seen. On reassembly tea was served in the Lounge at 4.30 and the company dispersed soon after 6 o'clock, after a very pleasant day.—W. J. K.

ENTOMOLOGICAL SECTION, BIRMINGHAM NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.—October 21st.—Professor Beckwith Whitehouse, President, in the Chair. Twenty members present. Mr. C. Wainwright gave a report on the Entomological Congress at Oxford, and Mr. S. E. W. Carlier gave a demonstration of the ribbon method of setting Micro-lepidoptera. Mr. F. H. Lees illustrated with specimens "A note on *Zygaena purpuralis*", and Mr. P. Siviter Smith showed series to illustrate "Observations on *D. truncata*, *D. concinnata* and *D. citrata*". Mr. Manley exhibited *Polia nigrocincta* from Cornwall and several members had other exhibits of interest.—P. SIVITER SMITH.

THE ENTOMOLOGIST.

VOL. LXIX.]

FEBRUARY, 1936.

[No. 873]

THE MECHANISM AND MANNER OF ACTION OF THE SAW-FLY TEREBRAE.

By W. KEIR, B.Sc.

(Plates I and II.)

LITTLE previous work on this subject has been published, though Morice (5) and Chapman (1 and 2) have given accounts of observations on the saw-fly terebrae, while Enslin (3) figures the external appearance of the female saw-fly genitalia, and Peacock (6) refers to the sclerites and gives their homologies. General information regarding the ovipositor of Hymenoptera is found in Imms's *General Textbook* (4). Snodgrass's work on the bee (7) is very helpful, for the sclerites of the homologous organ—the sting—are very carefully worked out and figured, while in a more recent work (8) the musculature and mechanics of the sting have been similarly explained and depicted.

In the following paper the sclerites and musculature of the terebrae of two species of *Thrinax* (Tenthredinoidea) are described and figured, and their action explained.

The investigations were carried out under the direction and guidance of Prof. A. D. Peacock, University College, Dundee, who has further kindly made many corrections and suggestions while this paper was being prepared for publication.

Methods.—Adult *Thrinax macula* and *T. mixta* provided by Prof. Peacock were killed and at once dissected, using a Reichert binocular microscope. This was carried out under water, mounted needles being used to clear away the fat body and expose the muscles. By using a sufficient number of specimens, and with experience so gained, these muscles could be distinguished, traced, and their relationships to the sclerites elucidated.

Serial sections of early and late pupae were made, and by reading them the features made out by dissection could be checked. This checking revealed nothing that could not be determined by dissection.

The movements of the sclerites during egg-laying can be observed in certain species. In the little cynipid, *Neuroterus lenticularis*, which lays in oak buds in spring, the terebrae and associated sclerites are relatively large, and by observing these some idea of the function of the "quadrate plates" was obtained.

ANATOMY.

The structure and arrangement of the sclerites.—The last undifferentiated segment in the female saw-fly is the seventh (Pl. I, fig. 1). In the eighth the tergum is fully developed, being the last spiracle-bearing plate, but the sternum is reduced to two small, paired, lateral plates, which have been termed the "triangular plates" (Pl. I, fig. 2). In the ninth segment the tergum is recognizable, but is narrowed in the dorsal region, so that it appears as two large lateral plates, which have been termed the "quadrate plates", connected by a membranous bridge over the back. The sternum of the ninth segment, like that of the eighth, consists of two lateral pieces, but these are larger than the triangular plates and have been termed the "oblong plates" (s. IX, Pl. I, fig. 2). The tenth segment is represented by two dorso-lateral plates connected by a membranous bridge. They bear the anal cerci at their lower angles.

The genitalia (Pl. I, fig. 2) consist of the usual three pairs of gonapophyses. The anterior pair, or ventral valves, belonging to the eighth segment are modified as the saws. Each has what Chapman has called a "lattice girder" structure (Pl. II, fig. 8), having a laterally compressed blade supported by a chitinized "wire" posteriorly, from which chitinized bands cross to the anterior edge which bears the teeth. The latter are shaped so that the retraction of the saw makes the cutting "stroke". The anterior edge ends proximally in a "saw plate", while the wire forms a long "bow" curving backwards within the abdomen.

The posterior or inner valves of the genitalia, arising from the ninth segment, are modified to form the guides or supports of the saws. In *Thrinax* and several other genera, *e. g.* *Trichiosoma* and *Phymatocera* (Chapman), they are fastened together posteriorly, the whole being almost semicircular in cross-section (Pl. I, fig. 3). Anteriorly they have each a rail fitting into a groove on the wire of the corresponding saw. Proximally the supports end in two processes bluntly, except for the rails, which continue as bows accompanying the bows of the saws. The saws and supports form the terebrae.

The dorsal, or outer, pair of gonapophyses, from the ninth segment, arise behind their respective oblong plates (Pl. I, fig. 2 and Pl. II, fig. 7) and form a sheath for the terebrae, being connected dorsally.

The arrangement of sclerites is the same on either side. The quadrate plate connects anteriorly (Pl. I, fig. 4) with the posterior angle of the triangular plate, both having peg-like processes which articulate and are firmly held together by membrane. The anterior

angle of the triangular plate is fastened by membrane, slightly chitinized, to the grooved wire of the saw (Pl. I, fig. 5); the sclerite may rest on the oblong plate ventrally, but there is no articulation and no membranous connection.

The oblong plate has three processes. The anterior one is fastened to the rail of the saw-support by membrane, slightly chitinized (Pl. I, fig. 6). The ventral process is peg-like and may be said to articulate with a short process of the proximal end of the support, though the latter is only slightly chitinized. The two parts are firmly fastened together by membrane. Posteriorly the oblong plate is attached by membrane to the sheath, and in the dorsal part of the membrane—*i. e.* on the floor of the abdomen—there are two small sclerites firmly connected with the sheath (Plate II, fig. 7, "sclerites").

The musculature.—Six muscles originating in the inner side of the quadrate plate, with four other muscles, make the total of ten muscles acting on the terebrae on each side. As may be seen from Plate II, fig. 7, they run as follows:

(1) From the sternum of the seventh segment to the wire and saw-plate of the saw—the auxiliary muscle of the saw.

(2) From the posterior edge of the tergum of the eighth segment to the triangular plate—the auxiliary muscle of the terebrae.

(3) From the triangular plate to the anterior small sclerite of the sheath—the retractor of the saw.

(4 and 5) From the dorsal edge of the quadrate plate to the anterior edge of the oblong plate—the protractors of the saw.

(6) From the dorsal edge of the quadrate plate to the posterior edge of the oblong plate—the retractor of the saw.

(7) From the rail of the support to the postero-dorsal process of the support—the flexor of the terebrae.

(8) From the posterior edge of the oblong plate to the postero-dorsal process of the support—the extensor of the terebrae.

(9) From the postero-ventral angle of the quadrate plate to the posterior small sclerite of the sheath—this may be a depressor of the sheath.

(10) From the postero-dorsal angle of the quadrate plate to the posterior small sclerite of the sheath—this may be the levator of the sheath.

The origins of these muscles are broad, but the insertions are often little less broad, and in Nos. 1, 3, 4 and 5 there is little convergence of the fibres.

THE MECHANICS OF THE SAWS.

Two chief movements are made by the terebrae: first, the swing of the terebrae as a whole, from the sheath in an antero-ventral

direction (*i. e.* "terebal flexion"), and secondly, the motion of the saws relative to one another and to the supports (*i. e.* "sawing"). The diagram (Pl. II, fig. 8) shows the whole mechanism.

(1) *Terebral flexion*.—This is the first movement in the act of egg-laying, and brings the terebrae into a position roughly at right angles to the abdomen. It is effected by the contraction of muscle 8, the extensor, and is opposed by that of muscle 7, the flexor. Both act on the postero-dorsal process of the support and about the junction of its anterior process with the ventral process of the oblong plate, causing the bending or straightening of the bows of the terebrae. Muscle 1 may aid muscle 8 in the extension of the terebrae.

(2) *Sawing*.—The sawing action is caused by muscles 3, 4, 5 and 6, possibly aided by 1 and 2. Protraction of the saws is effected by muscles 4 and 5, while 3 and 6 bring about their retraction, but the action of the muscles in producing these motions is not at all direct, and is obviously secondary and evolved from a more simple function. It may be explained as follows:

(a) By the contraction of 4 and 5, the quadrate plate and the anterior process of the oblong plate approach one another, *tending to produce* a protraction of the saw by the action of the quadrate plate on the triangular plate, and a retraction of the support by the action of the ventral and anterior processes of the oblong plate on the support. This movement is opposed by the action of 3 and 6; 1 and 2 may aid the retraction of the saws.

(b) Certain facts condition the *resultant motion* of the saws. First, *the quadrate plates are really one piece* due to the dorsal bridge. Thus it is difficult for *both* quadrate plates to be approached to their respective oblong plates at one time, it being, therefore, difficult for both saws to be protracted together. In fact were muscles 4 and 5 to contract on both sides together the only movement possible is the retraction of the supports, and if 3 and 6 acted simultaneously on both sides the most probable motion is the protraction of the supports, the saws remaining still all the time.

(c) For the saws to act efficiently, the corresponding sets of muscles on either side must *contract alternately*, causing a see-saw movement of the joined quadrate plates. This *tends to produce*, on each side, the simultaneous protraction of the saws with the retraction of the corresponding half of the support (by contraction of 4 and 5) and *vice versa* (by the contraction of 3 and 6).

But the supports are always fused together dorsally for at least some part of their length, and it is therefore impossible for them to move alternately; thus their relative tendencies to move being equal and opposite, they remain still while *the total effect of the*

muscular action is transmitted to the saws, which are free with respect to one another, and are made to slide to and fro on the rails of the stationary support. Hence the most efficient motion of the saws is alternate, while any protrusion or retraction of the supports must be simultaneous. *This theoretical conclusion is borne out by observers; they are agreed that the motion is not synchronized and some state that it is alternate.*

The other muscles are mainly auxiliary. Muscle 1 may help 4 and 5 in the retraction of the saws, its main action being on the saw plate, controlling the anterior edge of the saw, on which 4 and 5 cannot operate directly. Muscle 2 may aid 4 and 5, though it may also retract the whole apparatus, which may be slightly everted by pressure of the body-fluid, as in the bee. Muscles 9 and 10 probably control the sheath.

Egg-laying—Morice and Chapman (*loc. cit.*) have treated of the employment of the saws in egg-laying. Depending on the type of plant-material normally used for this purpose a sawing, shearing or boring action may be required, and certain corresponding specific adaptations are found in the shape, denticulations, etc., of the saws; but these differences do not affect the general mechanics and movements which are performed. The movements are of three kinds:

(1) The terebrae move into the material. Morice states this to be caused by flexure of the abdomen forcing the terebrae in, much as a hammer forces a nail. Snodgrass states that the alternate motion of the saws plays a part here, since the denticulations act as a ratchet, one saw being an anchor while the other is pushed ahead, then *vice versa*.

(2) Within the plant tissue the terebrae perform a forward-swinging movement, sometimes complicated by lateral or circular movements. The flexors and extensors (muscle 7 and 8) of the terebrae are probably mainly responsible for this. They may be aided by the movements of the whole abdomen.

(3) Excavation of the material is carried out either to produce a cavity for the entry of the terebrae as in 1, or to make way for the flexion of the terebrae in the formation of pockets as in 2. This is done by the saws, and may consist of laceration of plant-tissue by the saws independently, or of a shearing action (produced after the manner of a hay-mower) by the closely apposed, serrated edges of the saws moving alternately and acting in conjunction, as suggested by Chapman.

COMPARISON WITH THE BEE STING.

For this purpose Snodgrass's descriptions were carefully followed and a honey-bee (worker) was dissected. The first feature of the

bee to be noticed is the heavier chitinization of the sclerites—condition producing shapes more definite than those found in the saw-fly. Reduction has also taken place, eliminating the sclerite and cerci of segment X, the dorsal bridge of tergum IX and the dorsal chitinization of the tergum of segment VIII forming two spiracle-bearing plates. Probably as a result of this reduction the whole apparatus of the sting is sunk farther into the abdomen than is that of the saw-fly, occupying a “sting chamber”, which must be everted before the sting comes into use; this is done by pressure of the body-fluid. The important differences from the point of view of the mechanics of the genitalia are: The quadrate plates are separate; the triangular plate has a ventral peg articulating with the oblong plate; and the bulb of the supports, the furcula, and other delicate processes for the articulation of the supports are all new, showing greater specialization of the supports. The musculature is the same except that Nos. 1 (the auxiliary muscle of the saw) and 3 (one of the retractors of the saw) are not mentioned by Snodgrass.

The result of these differences is that the independence of the quadrate plates allows the muscles to impart to them a slight rotary action which, given the articulation of the triangular plate with the oblong plate as a fulcrum, produces a rocking motion of the triangular plate, which is transmitted to the lancets (saws) as a protraction and retraction. The supports are, of course, joined, making the alternate motion of the lancets the most efficient one. This alternate motion has been observed by Snodgrass.

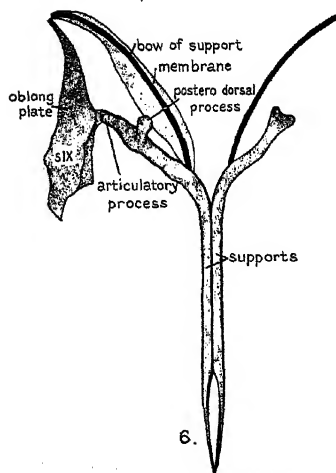
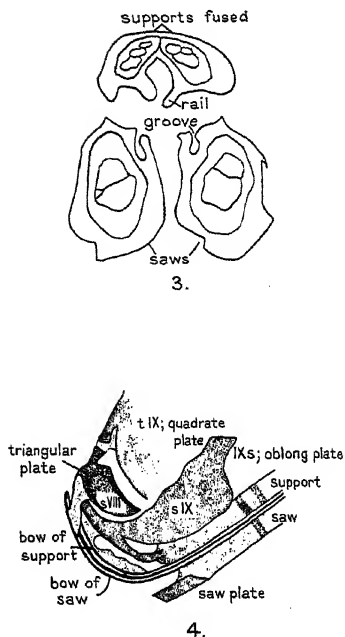
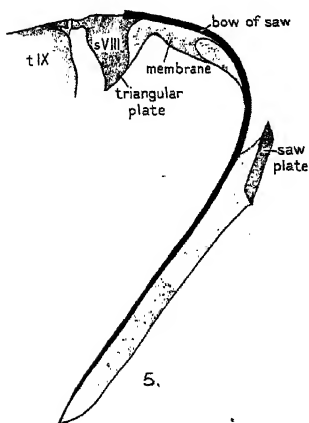
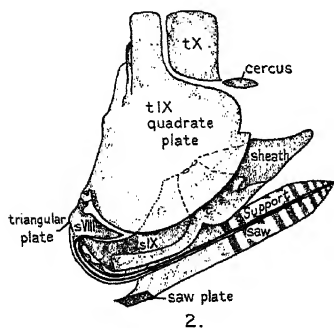
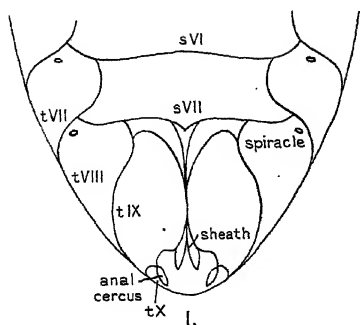
There can be no doubt that in general the extra articulation of the sclerites and the freedom of the quadrate plates is a more efficient mechanism than the corresponding one in the saw-fly. But the mechanism is much more rigid than that of the saw-fly, where lighter chitinization allows great flexibility. The sting is specialized for certain limited motions, while the saw-fly saws must perform a variety of movements requiring greater mobility, flexibility and adaptability.

The extra muscles of the saw-fly make little difference to the resultant motions. Muscle 3, the most important addition, probably makes up for the less efficient arrangement of plates.

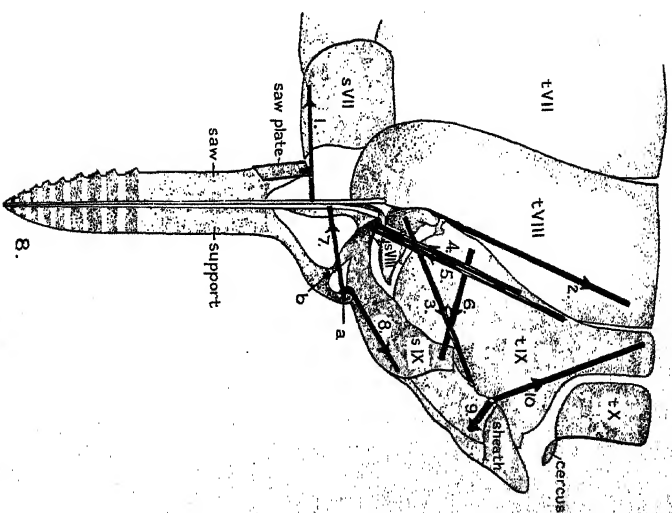
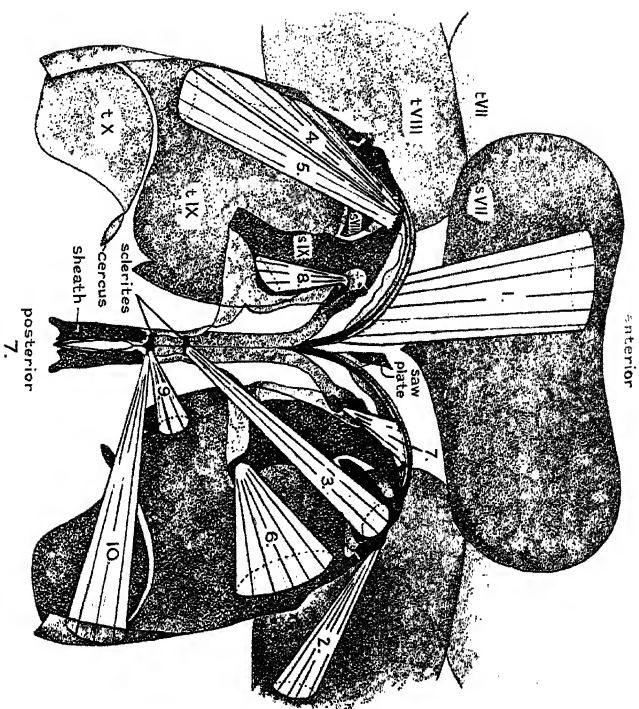
SUMMARY.

1. The relations of the sclerites of the last three segments of *Thrinax macula* and *T. mixta*, along with the muscles attached to them, have been investigated, described and figured to elucidate the mechanism which operates the terebrae.

2. Comparison has been made with the homologous parts in the bee as described by Snodgrass.



John Blair Spon & Denton, 174 London.



KEIR: MECHANISM OF THE SAW-FLY TEREBRAE.

CONCLUSIONS.

1. *Thrinax* is comparatively unspecialized in its abdominal segments, and probably shows one of the simplest types of terebral mechanism in the Hymenoptera.

2. The bee shows reduction of parts, with improved efficiency; the greater specialization and rigidity are probably adaptive.

BIBLIOGRAPHY.

- (1) CHAPMAN, T. A.—The Egg-laying of *Trichiosoma*, *Trans. Ent. Soc. Lond.*, June 25th, 1914.
- (2) *Idem.*—The Egg-laying of *Phymatocera aterrima*, *Ent. Rec.*, 27: 7 and 8, 1916.
- (3) ENSLIN, E.—Die Blatt und Holzwespen, *Ins. Mitt. Eur.*, 1913, p. 111.
- (4) IMMS, A. D.—*A General Text-book of Entomology*, Methuen, London, 1934.
- (5) MORICE, F. D.—Presidential Address, *Ent. Soc. Lond.*, 1912.
- (6) PEACOCK, A. D.—*Brit. Journ. Exp. Biol.*, 1, April, 1924.
- (7) SNODGRASS, R. E.—*The Anatomy and Physiology of the Honey-Bee*, McGraw-Hill, New York, 1925.
- (8) *Idem.*—How the Bee Stings, *The Bee World*, 14: 1, 1933.

EXPLANATION OF PLATES.

All the drawings, except No. 1, refer to *Thrinax macula*. In Figures 2, 4 and 8 the head is to the left.

PLATE I.

- FIG. 1.—Ventral view of the posterior segments of *Thrinax mixta*. $\times 40$.
 FIG. 2.—External view of the sclerites of the tip of the abdomen with terga VII and VIII removed. $\times 100$.
 FIG. 3.—Transverse section of saws and supports about $\frac{1}{2}$ way down, from a pupa with chitin not hardened.
 FIG. 4.—External view of the attachment of saw and support.
 FIG. 5.—Internal view of the left saw and its attachment. Teeth not shown. $\times 160$.
 FIG. 6.—Dorsal view of the supports and their attachment. $\times 160$.

PLATE II.

- FIG. 7.—Dorsal view of the tip of the abdomen opened, and with the musculature of the terebrae. $\times 150$. For explanation see text.
 FIG. 8.—Diagram, from an internal view of the right side, illustrating the manner of working of the saws. The arrows indicate the direction of "pull" of the muscles. *a*, Postero-dorsal process of support; *b*, junction of anterior process of support with ventral process of oblong plate. $\times 150$.

STRYMON W-ALBUM ATTRACTED TO COW PARSNIP.—Near Ranmore, Surrey, in 1935 I discovered a limited locality for *Strymon w-album*, and was particularly struck by its partiality for the flower-heads of cow parsnip. Although the immediate neighbourhood was profuse with many kinds of flowers, including bramble, nearly all the *w-album* seen were on the flowers of cow parsnip, which certainly seemed to take priority over the bramble usually associated with this species. Some were so engrossed with the plant that it was possible to take them with the finger and thumb.—E. E. JOHNSON; "Pilgrim's Way", Drive Spur, Kingswood, Surrey.

LEPIDOPTERA AT NORWOOD.

BY S. WAKELY.

To the collector of Lepidoptera the London suburbs furnish many surprises. Norwood is no exception, and I should like to record the most interesting species that have come under my observation in this district during the past season.

Crambus contaminellus was the most interesting to me personally, and it is nice to be able to note another locality in the London area for its occurrence, I having previously recorded it from Barnes Common (1934, *Entom.*, 67: 116). I took about three dozen altogether, from July 19th until August 8th. No moth-trap was used, and they were all taken off the windows overlooking the garden, which adjoins private tennis-courts, golf course, etc. It was noticeable that they appeared most frequently after midnight, but this habit was general with a number of other species as well.

Two specimens of *Palimpsestis octogessima* were taken, but this moth crops up frequently all over the London area wherever there are poplars.

Another surprise was *Earias chlorana*, several of which came to light in June. A search in late July for larvae on the willows (*Salix fragilis* ?), which grow in numbers on the sports ground already mentioned, was rewarded by the finding of about a score. The slight drawing together of the leaves of the terminal shoots by the larvae is very inconspicuous, and a careful scrutiny of each shoot was necessary—a slow process. This insect still occurs at Elmers End, about a mile away. With so many willows about it was not surprising to find that *Orthosia fissipuncta* also occurred here; but the specimen of *Eustrotia luctuosa* which came to light on July 10th was very unexpected, and judging from its fresh condition it must have emerged the same day and had flown no great distance.

Other species included: *Catocala nupta*, *Aethia tarsipennalis*, *Ptychopoda fuscovenosa* (*dilutaria*), *Plemyria bicolorata*, *Hydriomena procellata*, *Eupithecia subfulvata*, *Eucymatoge subnotata*, *E. tersata*, *Chloroclystis rectangulata* (ab. *nigrosericeata*), *Ennomos alniaria*, *Gonodontis elinguaris*, *Ouraapteryx sambucaria* and *Salebria formosa* (three at light).

Euzoptera pinguis is a species I have looked for in vain for some years, but in June I found a large ash tree growing by the roadside here, the bark of which showed signs of being attacked by larvae, quantities of frass being visible in the crevices of the bark. A larva dug out was obviously lepidopterous, so a daily search of the trunk was made during June and July. Two moths were taken on July 18th and another on August 8th by this means.

I had hoped to take a good series with little trouble, but was disappointed. Just at this time some bird paid a lot of attention to the trunk, and fresh holes were seen daily where no doubt pupae had been extracted. Three species of woodpecker occur here, so wood-feeding insects have plenty of enemies, but of course the tits may have been responsible in this case. However, I took five specimens at light which no doubt came from a large ash tree standing in a neighbouring garden.

Two specimens of *Homoeosoma sinuella* were taken, one being the pinkish form; I thought this was a coast species. *Crambus hortuellus* was the most common Crambid this year, outnumbering even *C. tristellus*, and was often seen even in the City as well.

Others noticed were *Loxostege verticalis*, *Phlyctaenia sambucalis*, *Scoparia frequentella*, *Endotricha flammealis*, *Euxanthia zoegana*, *E. hamana*, *Peronea sponsana*, *P. variegana* and *Eucosma bilunana*.

Cacoecia pronubana is widely distributed in the district, and larvae were noticed in spun shoots of privet growing in front gardens, numbers often occurring on one bush. I have failed to breed any parasites from this introduced species, which may account for its rapid spread and increase. The males fly freely during the day, and one would expect to see more of them as the larvae occur so freely.

Hemimene flavidorsana occurred on tansy in the garden; the plants were brought from Sydenham, where I found them growing on waste land (now built on). *H. politana* was taken on the sports grounds. *Laspeyresia woerberiana* and *Aegeria myopiformis* both occur in the garden in the bark of the apple trees, and I have seen the handsome Spotted Woodpecker searching for them during the winter.

Other species taken were *Aristotelia stipella* (larvae in blotches in leaves of *Chenopodium*), *Epitactis mouffetella*, *Telphusa luculella*, *Phthorimaea maculiferella*, *P. costella*, *Stomopteryx anthyllidella*, *Elachista apicipunctella*, *Brachmia rufescens*, *Chrysoclista atra*, *Mompha ochraceella*, *Chirocompa lunaris*, *Borkhausenia fuscescens*, *B. unitella*, *Argyresthia ephippella*, *Tischeria marginea*, *Monopis ferruginella*, *Tinea pallescentella* and *T. lapella*.

Nearly all the foregoing species were taken at light, but a few were taken on fences, etc.

4, Auckland Road,
Upper Norwood, S.E. 19.

LIMENITIS CAMILLA AB. NIGRINA.—I secured a splendid specimen of this aberration during 1935 in mid-Surrey.—E. E. JOHNSON; "Pilgrim's Way", Drive Spur, Kingswood, Surrey.

LEPIDOPTERA AT NORWOOD.

BY S. WAKELY.

To the collector of Lepidoptera the London suburbs furnish many surprises. Norwood is no exception, and I should like to record the most interesting species that have come under my observation in this district during the past season.

Crambus contaminellus was the most interesting to me personally, and it is nice to be able to note another locality in the London area for its occurrence, I having previously recorded it from Barnes Common (1934, *Entom.*, 67: 116). I took about three dozen altogether, from July 19th until August 8th. No moth-trap was used, and they were all taken off the windows overlooking the garden, which adjoins private tennis-courts, golf course, etc. It was noticeable that they appeared most frequently after midnight, but this habit was general with a number of other species as well.

Two specimens of *Palimpsestis octogessima* were taken, but this moth crops up frequently all over the London area wherever there are poplars.

Another surprise was *Earias chlorana*, several of which came to light in June. A search in late July for larvae on the willows (*Salix fragilis* ?), which grow in numbers on the sports ground already mentioned, was rewarded by the finding of about a score. The slight drawing together of the leaves of the terminal shoots by the larvae is very inconspicuous, and a careful scrutiny of each shoot was necessary—a slow process. This insect still occurs at Elmers End, about a mile away. With so many willows about it was not surprising to find that *Orthosia fissipuncta* also occurred here; but the specimen of *Eustrotia luctuosa* which came to light on July 10th was very unexpected, and judging from its fresh condition it must have emerged the same day and had flown no great distance.

Other species included: *Catocala nupta*, *Aethia tarsipennalis*, *Ptychopoda fuscovenosa* (*dilutaria*), *Plemyria bicolorata*, *Hydriomena procellata*, *Eupithecia subfulvata*, *Eucymatoge subnotata*, *E. tersata*, *Chloroclystis rectangulata* (ab. *nigrosericeata*), *Ennomos alniaria*, *Gonodontis elinguaris*, *Ourapteryx sambucaria* and *Salebria formosa* (three at light).

Euzoptera pinguis is a species I have looked for in vain for some years, but in June I found a large ash tree growing by the roadside here, the bark of which showed signs of being attacked by larvae, quantities of frass being visible in the crevices of the bark. A larva dug out was obviously lepidopterous, so a daily search of the trunk was made during June and July. Two moths were taken on July 18th and another on August 8th by this means.

I had hoped to take a good series with little trouble, but was disappointed. Just at this time some bird paid a lot of attention to the trunk, and fresh holes were seen daily where no doubt pupae had been extracted. Three species of woodpecker occur here, so wood-feeding insects have plenty of enemies, but of course the tits may have been responsible in this case. However, I took five specimens at light which no doubt came from a large ash tree standing in a neighbouring garden.

Two specimens of *Homoeosoma sinuella* were taken, one being the pinkish form; I thought this was a coast species. *Crambus hortuellus* was the most common Crambid this year, outnumbering even *C. tristellus*, and was often seen even in the City as well.

Others noticed were *Loxostege verticalis*, *Phlyctaenia sambucalis*, *Scoparia frequentella*, *Endotricha flammealis*, *Euxanthus zoegana*, *E. hamana*, *Peronea sponsana*, *P. variegana* and *Eucosma bilunana*.

Cacoecia pronubana is widely distributed in the district, and larvae were noticed in spun shoots of privet growing in front gardens, numbers often occurring on one bush. I have failed to breed any parasites from this introduced species, which may account for its rapid spread and increase. The males fly freely during the day, and one would expect to see more of them as the larvae occur so freely.

Hemimene flavidorsana occurred on tansy in the garden; the plants were brought from Sydenham, where I found them growing on waste land (now built on). *H. politana* was taken on the sports grounds. *Laspeyresia woerberiana* and *Aegeria myopiformis* both occur in the garden in the bark of the apple trees, and I have seen the handsome Spotted Woodpecker searching for them during the winter.

Other species taken were *Aristotelia stipella* (larvae in blotches in leaves of *Chenopodium*), *Epitheatia mouffetella*, *Telphusa luculella*, *Phthorimaea maculiferella*, *P. costella*, *Stomopteryx anthyllidella*, *Elachista apicipunctella*, *Brachmia rufescens*, *Chrysoclista atra*, *Mompha ochraceella*, *Chirocompa lunaris*, *Borkhausenia fuscescens*, *B. unitella*, *Argyresthia ephippella*, *Tischeria marginea*, *Monopis ferruginella*, *Tinea pallescentella* and *T. lapella*.

Nearly all the foregoing species were taken at light, but a few were taken on fences, etc.

4, Auckland Road,
Upper Norwood, S.E. 19.

LIMENITIS CAMILLA AB. NIGRINA.—I secured a splendid specimen of this aberration during 1935 in mid-Surrey.—E. E. JOHNSON; "Pilgrim's Way", Drive Spur, Kingswood, Surrey.

WHAT IS ABERRATIONAL INFLUENCE ?

BY G. B. OLIVER.

SINCE the publication of my note on *Polygonia c-album* in the March number of the *Entomologist* (68 : 68), it has been brought to my notice that a few lepidopterists have suggested that the aberrations reared, not only of *c-album*, but also of other butterflies which have at times appeared in my cages, are artificial, or, in other words, were produced by methods similar to those used in the well-known German temperature experiments. This is not the case. I have neither incubator, refrigerator, nor as yet a glasshouse, hot or cold, nor access to any such aids at any time. I appear to have been fortunate in rearing a fair share of aberrations, but this is partly due to the large quantities handled at a time, and to a method of inducing specimens, which ordinarily would have been cripples, to fully develop their wings. The present seems a fitting occasion to put the question heading this note, and to answer it, for my own part, by giving experiences over many years of mass rearing and by observations in the field, and also to explain my mode of rearing.

Some collectors appear to hold the opinion that aberrations (excluding forms which are merely constant varieties, such as *Colias croceus* v. *helice* and *Argynnis paphia* v. *valesina*) are recurrent, and will normally appear at some time in any locality. I do not share this view, but believe that there is an individual reason for every—shall we term it—"strained" aberration. I divide aberrations into two main classes : (a) those due to weakness of the brood or of the individual, such as spotless "Blues", albinism or abnormal colour variations, gynandromorphism ; (b) those caused by some outside influence or atmospheric condition, not necessarily heat. In this group I place the blackened or strained forms of fritillaries and Vanessas, black *Limenitis camilla*, rayed "Blues".

I remember reading, about twenty-five years ago, an account of the German temperature experiments. At that time I was connected with the cinema business, and tried to discover what might happen to pupae subjected to artificial heat, using the cinema lantern arc as warming apparatus. The result was disastrous, every one being killed. After that I gave up the idea as a bad job, but told a well-known entomologist of my attempt. He tried the same experiment in a gas oven—and cooked the lot ! Apparently the episode of the arc lamp has been passed on, unreasonably suggesting that these experiments have been carried on till the present day, whereas since 1915 there has been no opportunity to continue, even had I so wished. I then began to consider what connection the temperature of the atmosphere might have with the appearance of wild

aberrations. By noting dates when they occurred and referring to the state of the weather when they would have been fully-fed larvae or freshly turned pupae I was eventually able to forecast, to some extent, approximate dates when wild aberrations (b) might be expected. It seems hopeless to expect aberrations as the result of a heat-wave, but the change just before or after the hot spell does appear to have some effect. It is possible, and I think probable, that the larva which will produce an aberration is one of the weaklings, and more susceptible to the influence of weather changes. I feel convinced that the (b) group are really the result of Nature's temperature changes, and it does not appear that a very great variation is necessary. Fluctuations such as are caused by sunshine and rain or shadow or the contrast between hot days and cold nights may be sufficient. I have two or three occasions in mind on which this weather theory seems proved, but will merely give the most recent. In July last I gathered several young broods of *Aglais urticae* larvae, but owing to my time being rather fully occupied they were neglected and often without food, with the result that when nearly full fed they were all decidedly dwarfed. Having no use for starvelings they were put out, about 1000 larvae, on a large patch of nettles (upon which there was already one wild brood) in a sheltered hollow near here, which becomes uncomfortably hot on a bright summer's day. When they were due for emergence I searched around and saw altogether about thirty specimens, all but one being undersized; obviously they were the result of my starved larvae. Two or three nice forms appeared at first, and then on August 29th was secured an extreme aberration having the costae of the fore wings blackened and hind wings of a sooty-black shade without any colour relief. This specimen is not the first aberration obtained from this particular ground, so it seems reasonable to suppose that the situation, combined with suitable weather changes, which did occur this year, caused them.

Those who have worked *Lysandra coridon* and *L. bellargus* will have noticed numbers of asymmetrically marked and formed specimens, many of which were incapable of flight, and but for the short herbage would not have been seen. Cripples in the larger woodland species, naturally, are less often met with. When butterflies are reared, all deformed specimens are seen, and some, by careful attention, can be made into respectable cabinet specimens. The more extreme in form the aberration the less appears its chance of emerging and developing into a perfect fly. From rearing experience I should say that seven out of ten of the better forms are never seen in flight, either on account of failure to clear the pupa-case, or through inability to fully develop their wings. Some of those which I have bred have been rescued from the floor of the cage,

where they had fallen through weakness, and held by the legs till the wings expanded and hardened, and at times it has been necessary to gently stroke the wings with a pin to induce the flow of the fluid down the veins and so aid their expansion, thus making, when the operation is successful, a perfect specimen out of one which, had it been left to itself, would have been a cripple. The black-banded *c-album* mentioned in my earlier note would not have been seen in nature. It pupated and emerged in the sleeve, and when found was suspended by the rear pair of legs from the membrane of the pupa-case, without the energy to disentangle itself, nor, when released, could it fly.

Perhaps the chief reason why the majority of collectors do not obtain more aberrations from their bred insects is because they nurse the larvae, protecting them from every ill wind, often by feeding indoors in a temperature fairly uniform, whether warm or cold, or if outdoors, too heavily sleeved or "wrapped up". My method is, simply, "Nature"; leaving them outdoors in all weathers; not protected from sun, wind or rain, nor especially exposing them, but just allowing them to receive whatever the weather has to offer. Cages are covered, including the top, with light, open-mesh muslin which gives a free access to fresh air, so that larvae are subjected to the same weather changes within a narrow margin as though they were out in a wild state. Some cages have a glass front, but these are observation cages for pairing, laying and young larvae. During later larval stages and pupation there is no glass.

Hazlemere,
High Wycombe;
September, 1935.

DANAUS CHRYSIPPUS AT SEA.—In regard to Mr. Nicholson's interesting article on *Danaus plexippus* in the British Isles, it may be of interest to record that when I was returning from the Far East on the s.s. "Orient" in July, 1908, playing cards one night in the smoking room on the upper deck with all windows open, a *D. chrysippus* (form *dorippus*) flew into the room between 10 and 11 p.m. It encircled the light once or twice and then settled down to rest. This was in the Red Sea, and the nearest land was certainly over fifty miles distant. The butterfly settled on the ceiling and was easily captured and is now in my collection. Had I not been a "knowledgeable" person, it might have quite easily been transported into the Mediterranean or even into home waters. The interesting fact is that the butterfly was evidently flying across the ocean at night, and that it welcomed the shelter of the steamer and was quite prepared to come along as a passenger.—ARTHUR WELTI; Tower House, 40, Trinity Square, London, E.C. 3.

SOME AFRICAN OSMIINE BEES.

By T. D. A. COCKERELL.

IN North Africa *Osmia* is very richly represented. Pérez and others described many species, but did not nearly exhaust the subject, as is shown by the fact that Benoist (1928-1929) has recently published twenty new forms, mostly from Morocco. The whole Ethiopian region has thirty-two recorded species, nearly all from South Africa, but they form only a small part of the fauna and the individuals are usually not numerous. Some of the species are very peculiar, indicating that the group has long existed in the country, so it is not apparent why it has not produced numerous species as in Palaearctic Africa.*

Osmia neavei sp. n.

♀. Length 11-12 mm., anterior wing about 8; rather robust, black; head and thorax with rather dull white hair, dense and white at sides of face, on clypeus thinner, and easily deciduous in middle; some orange hairs from beneath margin of clypeus; mandibles black, tridentate, the broad obtuse apical tooth with a strong sulcus on outer face; clypeus convex, very densely punctured, with no smooth line, the margin shining, simple; supraclypeal area densely punctured; antennae short, black, the flagellum faintly brownish beneath; mesothorax and scutellum dull, very finely and densely punctured; the scutellum with a shining line in middle; area of metathorax swollen and shining in middle; tegulae dull whitish with a reddish base; wings hyaline, with rather pale nervures; basal nervure going a little basad of nervulus; first recurrent nervure ending as far from base of second cubital cell as length of first intercubitus; legs black, with pale hair, ferruginous on inner side of tarsi; tarsi dark red apically; abdomen densely punctured, the margins of tergites rufescent, and with narrow pure white bands, the effect being that of clear white bands bordered with reddish anteriorly; ventral scopa bright orange, the last sternite with only very short hair; pulvilli well developed. One specimen is only 10 mm. long.

N.E. Rhodesia: Niamadzi River, near Nawalia, 2000 ft., August 17th-22nd, 1910, 8 ♀ (S. A. Neave). British Museum. From two other species of similar size and build it is separated thus:

Abdominal bands linear and inconspicuous; tegulae black; wings strongly dusky (Natal)	<i>natalensis</i> Ckll.
Abdominal bands well developed, not linear	1.

* *Megachile* offers a striking contrast. I now have records of 75 species (including *Gronoceras*) from the Katanga Province (Belgian Congo) alone.

1. Wings dusky; no reddish margin before the dull white hair-bands *intrapicta* (Ckll.).
 Wings clear; a reddish margin before the clear white hair-bands *neavei* Ckll.

Osmia infrapicta (Cockerell, 1916).

♀. Length nearly 11 mm.; black, robust; mandibles, antennae and legs black; ventral scopa entirely very bright red. Face broad, with white hair, dense, shining and pure white at sides, brownish along clypeal margin, white but rather thin on cheeks, fulvescent on vertex; mandibles quadridentate, second tooth large, third small and pointed; base of mandibles with thin, inconspicuous whitish hair; mesothorax dull, shining on middle of disc; scutellum a little shining; basal area of metathorax large, smooth and highly polished; thorax above with thin red hair, abundant and bright on scutellum; pleura and metathorax with rather dull white hair; tegulae shining dark reddish brown, with translucent margin; wings dusky greyish; basal nervure meeting nervulus; first recurrent nervure ending far from base of second cubital cell, second much nearer apex; legs with pale hair, red on inner side of tarsi, fulvescent at end of front and middle tibiae; hind basitarsi rather narrow, with a copious fringe of reddish hair; abdomen broad, shining black, first tergite with thin white hair; tergites 1 to 5 with narrow, white hair-bands, hardly enlarged at sides; thin dorsal tomentum white; sixth tergite strongly concave in lateral view.

Cape Province: Doorn River, near Camfer, November 3rd (*Alice Mackie*). This was described as *Megachile*, but is readily separated from that genus by the pulvillus between the claws. The Doorn River specimen, described above, is fresher than the type.

HERIADOPSIS Cockerell.

Heriadopsis striatulus Cockerell, 1931.

Belgian Congo (Katanga): Kafubu Mission, September, 1 ♂ (*Alice Mackie*); Elisabethville, September, 1 ♂ (*J. Ogilvie*). This singular little insect has (male) long and stout spines on front coxae, but the stigma is well developed, and the feet have pulvilli. The front legs are bright red, with the femora swollen.

COLIAS CROCEUS IN THE ISLE OF MAN.—Between September 6th and 8th, in the Isle of Man, my father captured seven *Colias croceus* (*edusa*), three males, four females, and saw about eight more, all between 11 a.m. and 2 p.m., flying along a marsh in a south-westerly direction, stopping on their way to settle on reed-heads. The weather was warm and the sun out almost continuously.—JEFFREY JACKSON; White House, R.A.F. Depot, Uxbridge, Middlesex.

NOTES ON BRACONIDAE: XV.—MICROGASTERINAE.*

BY CLAUDE MORLEY, F.E.S., F.G.S., F.Z.S.

No more introduction to this ubiquitous subfamily is necessary than to say that it is constituted of those nasty little black "flies" which are all too often bred by lepidopterists, most especially from such hosts as *Abraxas grossulariata* and *Pieris brassicae*; everyone knows *Apanteles glomeratus* and *Microgaster "globatus"* by sight, if not by name. My objects in publishing these notes are to draw attention to the somewhat extensive breedings from new hosts that those lepidopterists have been good enough to send me for names from time to time; to bring forward one or two kinds new to Britain; to describe a new species; and, most especially, the life-histories of such obscure parasites as *Microgaster rugulosus*, of which nothing was ascertained until Mr. Alfred Sich found it to destroy one of our sub-aqueous moths within the latter's larval cases on water-weeds, which fact at once lends us a clue to the economy of allied parasites. The whole is comprised in two small and three somewhat extensive genera.

TABLE OF GENERA.

- (2) 1. Antennae 20-jointed; first recurrent nervure continuous through median i. ACOELIUS, Hal.
 (1) 2. Antennae at most 18-jointed; lower basal cell longer than upper.
 (4) 3. Palpi 4-jointed; antennae 14-jointed ii. MIRAX, Hal.
 (3) 4. Palpi 5-jointed; antennae 18-jointed.
 (6) 5. External nervure of areolet pellucid or wanting iii. APANTELES, Fst.
 (5) 6. External nervure of areolet always fairly strong throughout.
 (8) 7. Hind tibial calcaria shorter than half metatarsus; segments 2-3 not or hardly transimpressed iv. MICROPLITIS, Fst.
 (7) 8. Hind tibial calcaria longer than half metatarsus; segments 2-3 distinctly transimpressed v. MICROGASTER, Latr.

ACOELIUS, Haliday.

Entom. Mag., 1833, 1: 262.

Table of Species.

- (4) 1. Head and thorax entirely black.
 (3) 2. Median and costal cells of equal length 1. *subfasciatus*, Hal.
 (2) 3. Median a little longer than costal cell 2. *viator*, Fst.
 (1) 4. Head entirely, and most of thorax, red 3. *erythronotus*, Fst.

* Cf. Entom., 1933, 66: 136.

1. *Acoelius subfasciatus*, Hal.

An abundant parasite upon Tineid moths, especially of the genus *Nepticula*, from no less than ten of whose species it has been reared (cf. *Trans. Ent. Soc.*, 1933, p. 183). Five specimens emerged from *N. trimaculella*, Haw., at Lee in Kent between May 27 and June 11th, 1896, with a half-dozen (doubtless hyperparasitic Chalcids; a male was raised from the triangular larval cocoon of *N. basiguttella*, Hein, in 1900 that had been collected at Danbury in Essex during the previous autumn; and a female was reared from the flat and papyraceous cocoon of *N. aurella*, Fab. (an eleventh *Nepticula* host), at Corfe Castle in Dorset during 1902 (Eustace Bankes, in coll. Morley). The species is not common on the wing. I have taken it from early June to mid-September by beating tree boughs at Wilverly Inclosure in the New Forest; at Reydon, and on the windows of Monks Soham House, in Suffolk.

2. *Acoelius viator*, Först.

A male was sent to me for identification by Mr. Donisthorpe that had been "taken with *Formica rufa* in the Highlands" on September 29th, 1908 (cf. *Entom. Rec.*, 1908, p. 284, and *Brit. Ants*, p. 262). Described from Aix-la-Chapelle.

3. *Acoelius erythronotus*, Först.

First described like the last. The sole British example I have seen is a female that I swept from reeds growing in the brackish water of the Buss Creek at Southwold in Suffolk on September 14, 1907. Probably no more than a colour-form of the above.

MIRAX, Haliday.

Entom. Mag., 1833, 1: 263.

The sole species, *M. spartii*, Hal., is a known parasite of Tineid moths belonging to the genus *Nepticula*. Females have been reared from *N. septembrella*, Staint., upon two occasions; and the Rev. T. A. Marshall has noted, in his own interleaved copy of his *Monograph of British Braconidae* (*Trans. Ent. Soc.*, 1885): "*M. spartii* male differs not from the female; the antennae are similar, 14-jointed. Bred by W. H. B. Fletcher from *Nepticula betulicæ* Ste.—four males sent to me by Bridgman", which is the basis of his new male description in *Species Braconides d'Europe*, 1888, p. 392. He considered Haliday's discovery of females in some number on broom to have been accidental; but I have beaten the same plant from that plant on a sandy plateau at Brandon in Suffolk as I did in the year as September 27th, 1907. Since none of the v

numerous British *Nepticulae* are known to feed on broom, their parasite probably resorts to this plant for mere hibernation ; though the allied *Trifurcula immundella*, Zell., whence no parasite has ever yet been bred, is common on broom.

APANTELES, Förster.

Verh. pr. Rheinl., 1862, p. 245.

Table of Species.

- (143) 0. Basal segment merely about as long as, not distinctly longer than broad.
- (62) 1. Second segment about as long as third ; terebra always very short.
- (9) 2. Third segment at least basally rugose.
- (4) 3. Hind femora for the most part testaceous
1. *solitarius*, Ratz.
- (3) 4. Hind femora mainly nigrescent or entirely black.
- (6) 5. Two basal segments carinate in their centre
2. *salebrosus*, Msh.
- (5) 6. Two basal segments with no central carina.
- (8) 7. Hind tibial inner calcar longer than $\frac{1}{2}$ metatarsus ; tegulae testaceous 3. *carbonarius*, Wsm.
- (7) 8. Hind tibial inner calcar shorter than $\frac{1}{2}$ metatarsus ; tegulae black 4. *tetricus*, Rnh.
- (2) 9. Third segment glabrous or but finely punctate.
- (19) 10. Hind coxae dull and granulose. All species over 2 mm.
- (16) 11. Front coxae at least apically testaceous.
- (13) 12. Tegulae black ; hind tarsi always distinctly red
5. *villanus*, Rnh.
- (12) 13. Tegulae pale ; hind tarsi at least apically infuscate.
- (15) 14. Mesonotum distinctly convex, always entirely black
6. *ruficrus*, Hal.
- (14) 15. Mesonotum deplanate and always entirely testaceous 7. *ferrugineus*, Msh.
- (11) 16. All the coxae entirely black throughout.
- (18) 17. Venter broadly testaceous basally 8. *ordinarius*, Ratz.
- (17) 18. Venter black or only laterally translucent basally
9. *congestus*, Nees.
- (10) 19. Hind coxae nitidulous and not or hardly punctate.
- (23) 20. Legs pale with at most the hind coxae partly black.
- (22) 21. Hypopygium surpassing anus ; ♀ antennae short ; abdomen mainly red 10. *bignelli*, Msh.
- (21) 22. Hypopygium hardly reaching anus ; ♀ antennae as long as body ; abdomen mainly black
11. *analis*, Nees.
- (20) 23. Legs darker with at least whole hind coxae, often femora, black

- (37) 24. Hind femora testaceous, at most with apices sometimes black.
- (26) 25. Second abdominal segment not at all carinate
11. *analis* (bis).
- (25) 26. Second segment bearing a nitidulous carina.
- (28) 27. Two basal segments laterally pale; stigma piceous
12. *limbatus*, Msh.
- (27) 28. Two basal segments indistinctly pale; stigma rarely dark.
- (30) 29. Mesonotum and pleurae nitidulous and nearly smooth
13. *affinis*, Nees.
- (29) 30. Mesonotum densely punctate throughout.
- (32) 31. Tegulae brunneous testaceous; legs rosy
14. *rubripes*, Hal.
- (31) 32. Tegulae entirely black; legs testaceous.
- (34) 33. Wings subinfumate; length 3 mm.; cocoons cream-colour
15. *rubecula*, Msh.
- (33) 34. Wings hyaline; length 2-2½ mm.; cocoons flavous or white.
- (36) 35. Mesopleurae smooth; length 2½ mm.; cocoon flavous
16. *glomeratus*, Linn.
- (35) 36. Mesopleurae densely punctate; length 2 mm.; cocoon white
17. *vanessae*, Rnh.

(To be continued.)

NOTES AND OBSERVATIONS.

NYMPHALIS ANTIOPA IN DERBYSHIRE.—On July 31st, 1935, I saw a fine specimen of this species basking in the hot sunshine on the greenery on the banks of the River Derwent at Matlock Bath.—A. W. RICHARDS; Beauchief, Hillside Road, Aldershot.

DANAUS PLEXIPPUS AT BEXHILL.—As it was my observation of *Danaus plexippus* which is referred to for Little Common (Bexhill) on September 26th, 1933, by Mr. C. Nicholson (*Entom.*, 68: 249), fuller details of its behaviour may be of interest. The time was about 3.30 p.m. and the weather perfect. I was motoring towards Eastbourne when the butterfly sailed across the main road just in front of the car and from S. to N. I stopped at once and with two passengers walked back, and there was *D. plexippus* sunning himself on a Dahlia blossom in a private garden, and only a few feet away. Unfortunately we had no net, and it was a private garden into the bargain. By the time I had received permission from the householder to start the hunt the quarry was restless and after one unsuccessful pass with my hat it sailed away over the house and was gone to the North. The memory is still very vivid, and even if I never come across another Milkweed Butterfly I can still feel the

astonished thrill I received that sunny afternoon when *D. plexippus* turned up so unexpectedly.

One or two notes on pp. 255 to 257 (*Entom.*, 68) under the name *H. G. Marsh* should read *H. G. Macleod*.—H. G. MACLEOD; 52, London Road, St. Leonards-on-Sea.

GONEPTERYX RHAMNI IN DECEMBER.—I read with interest Mr. F. W. Frohawk's record of *G. rhamni* appearing in November. I have a record of the appearance of a very good specimen of this butterfly at the Concrete Works, Barrow-on-Soar, Leicestershire, on December 3rd, 1934. The day was quite sunny without any wind, and the shade temperature was 54° F.—C. J. TATHAM; Hon. Sec., Barrow-on-Soar Entomological Club.

GONEPTERYX RHAMNI IN NOVEMBER.—In the *Entomologist* (62 : 17, and 69 : 14) I recorded the late appearance of *G. rhamni* on November 3rd at Mitcham, Surrey. Lord Bolingbroke kindly informs me that he saw a male flying to and fro along a hedgerow on a fine sunny morning, on November 9th last, at Lydiard Park, Swindon.—F. W. FROHAWK; Sutton, Surrey.

VANESSA CARDUI AT SEA.—I have been asked by Dr. J. S. Hudson, of 7, Leith Mansions, Elgin Avenue, W.9, to publish the following observation which he made on a voyage home from S. America in the autumn of last year. On September 28th, when about midway between the Cape Verde Islands and the African coast, on the normal course, the ship steamed through a swarm of *Vanessa cardui*. The weather was warm and "soft", with fine drizzle and a moderate N.E. trade wind. All day the butterflies were about the ship, and it was estimated that those seen amounted to some hundreds. The following morning only one or two were seen. The direction of flight was not determined.—N. D. RILEY.

MANIOLA JURINA (LINN.) IN N.E. DERBYSHIRE.—In August, 1921 (my first year as a collector), I captured a worn male of this species at Ault Hunknall. I had never previously seen the species, and in 1922 I searched a large area for it without success. The late Mr. S. Hooke, of Staveley, informed me that he too came upon a single specimen in 1921, the first he had ever seen there in his long entomological experience. At the beginning of August, 1923, I brought about thirty females of *jurtina* from Market Harborough and liberated them at a likely spot near Hardwick. It was twelve years later, 1935, when I again visited N.E. Derbyshire in summer, and I was delighted to find *jurtina* very plentiful at the locality where I liberated the females. At first I felt inclined to attribute its presence and numbers to the natural increase in twelve years from the specimens which I put down, until I discovered it equally plentiful for miles around and even fifteen miles away at Beighton and Staveley, in neither of which localities had I ever seen it before. Perhaps some other Derbyshire collector can throw some light on

this curious extension of a sedentary species.—A. W. RICHARDS; Beauchief, Hillside Road, Aldershot.

ACHERONTIA ATROPOS AT SKELMANTHORPE.—As records of *Acherontia atropos* in 1935 seem rather scarce, it may be of interest to report that a fine female was taken here on September 5th.—W. BUCKLEY; Commercial Road, Skelmanthorpe, Huddersfield.

DEIOPEIA PULCHELLA AND ARGYNNIS LATHONIA, ETC., AT EASTBOURNE.—In 1901 I took a specimen of the Crimson Spotted Footman on the Downs here and have the insect in our collection. About the same time I also caught an *Argynnis lathonia* near Beachy Head. Two years ago (1933) I saw at least twenty *Colias hyale* on the Downs. This year (1935) I have not seen any, and only a few *Colias croceus*. Last year I saw one var. *helice* and a friend here caught two. Last year in the woods near Polegate, three miles from here, there were swarms of *Limenitis camilla*, and this year, too, there were a good many. They also appeared in the town. But the most noticeable thing lately has been the vast numbers of *Polygonia c-album* about. In July they were mostly of the light variety, but my son and I also saw one almost black on the upper side, but unfortunately it got away. During October and until the end of the month there were thousands of them on the wing both in the woods round Polegate and in the valleys of the Downs. These late ones of course were all of the dark underside variety. *Vanessa cardui* this year has not been very plentiful, but in October in sheltered valleys on the Downs there were a fair number of rather large size. Anyway they were larger than the summer brood. A fortnight ago a friend living close to me found a very fine specimen of *Acherontia atropos* sitting on the piano squeaking for all it was worth.—C. H. HUTCHINSON; 4, Meads Street, Eastbourne, November 11th, 1935.

AN UNUSUALLY LATE BROOD OF PIERIS BRASSICAE LARVAE.—On December 8th a half-dozen larvae of *P. brassicae* were taken from cabbage in the garden here. The brood had been noticed in November and its members were then numerous. That these six should have survived the rather severe frosts during the last week of the month seems remarkable enough to be worth recording. During the last fortnight they were in the open there was very little increase in size; feeding seemed to have practically ceased, and it is doubtful if the survivors of December would have reached the pupa stage outdoors. When taken they were 30 mm. long, and, comparing this with Frohawk's figures for the beginning and end of last stage, they may have been about half way through this stage. They could only be induced to feed by being brought into the warmth of a room, and then only very sparingly. However, they eventually attained a length of 36 mm., against Frohawk's maximum 41.3 mm., and all successfully pupated between December 16th and 19th. The pupae are about 23 mm. long, Frohawk's recorded pupa length being 25.4 mm. All are of the green variety. They appear to be

perfectly healthy, and may be expected to produce somewhat dwarf butterflies.—G. M. RUSSELL; 220, Herbert Road, Plumstead, S.E. 18, January 11th, 1936.

CATOCALA NUPTA AB. BRUNNESCENS.—I should like to record the capture of a specimen of *Catocala nupta*, in August last, with the normal red of the hind wings replaced by blackish brown. This is apparently the form figured in *Seitz*, and referred to as ab. *brunnescens*. According to South, similar specimens have been taken at Mitcham (1892), Wandsworth (1895), Chingford (1896) and Brondesbury (1897). The specimen now referred to was found by Mr. H. A. Davenport in a house in Esher, Surrey, and is now in my collection. There is a short split at the apex of the right upper wing running parallel with the costa; otherwise the specimen is in very fair condition.—E. S. A. BAYNES, F.R.E.S.; Monkshatch Cottage, Compton, Guildford, December 23rd, 1935.

PLUSIA GAMMA OBSERVATIONS AT HASTINGS.—At lights on the sea front at Hastings, where the Silver Y moth had been very common in August and in dozens up to September 27th, the last twelve seen in 1935 were captured for observation between November 5th and 21st, by which time the temperature had fallen to 44° F. Two of the captures laid eggs (350) between November 19th and 24th, on which latter night there was a sharp frost. Under natural conditions the eggs soon turned dark, but none have hatched. The last of the ten male moths captured died on December 15th.—H. G. MACLEOD; 52, London Road, Hastings, January 1st, 1936.

BUCCULATRIX MARITIMA STT. 1ST BROOD.—In the *Entomologist* for April, 1935, p. 91, I reported on a form of this species which I have now proved to be its second brood. These were very small, being only 7 mm., and unicolorous brownish ochreous. During the past season I endeavoured to get further information about the species. I went to the salt marsh on May 21st and found a number of mines in the leaves of the sea aster (*Aster tripolium*). I was rather late, however, as after a long search I only got two containing larvae, but found about twenty cocoons on the grasses and herbage nearby, so must conclude that the first brood is not nearly so numerous as the second or August brood. From these I succeeded in breeding out eight moths and two hymenopterous parasites. They emerged between June 19th and 25th, so evidently in North Lancashire they take four to five weeks from the spinning of cocoon to emergence. Excellent figures of the larva and the mine are given in *Stainton's Natural History of the Tineina*, 7, pl. 3, and his description of the larvae makes it unnecessary to repeat it here. The figure of the moth on the same plate, with a strong basal streak and well-defined markings, is perhaps the usual Southern form, as I have a series agreeing with it from Benfleet. The moths bred were much larger than the August brood, being 8 to 9 mm. Two of them are unicolorous, but the remainder have a pair of faint

oblique opposite spots at $\frac{3}{4}$. The spots are dullish ochreous, but the colour of the wings is fuscous. They appear quite melanic when compared with any I possess from other localities, or our own second or August brood.—ALBERT E. WRIGHT, F.R.E.S.; Brunleigh, Grange-over-Sands, January 10th, 1936.

IS *GERRIS NAJAS* SINGLE- OR DOUBLE-BROODED?—The British Gerridae are said to pass the winter in the adult stage, and are not supposed to be double-brooded. Butler's observations in his *Biology of the British Hemiptera-Heteroptera*, coupled with my own, lead me to think that *Gerris najas* may be double-brooded and that it may not winter as an imago. He says (p. 248): "Pairing takes place in April . . . the eggs are said to be laid in July, but this seems far too long after copulation, and certainly does not leave time for the insects to mature during August. It is much more likely that they are laid in May." I have, myself, taken this insect *in cop.* in mid July, the eggs in which case would certainly not be laid earlier than the end of July or the beginning of August; and a doubt arises in my mind as to the resulting insects being able to mature before winter, especially in a cold autumn. Anyway, this late egg-laying seems to point to a second brood. Mr. China, of the British Museum (Natural History), South Kensington, has been good enough to give me his opinion on the matter. He does not think that they are double-brooded, nor that they pass the winter in the egg or larval stage. He says, "Water conditions in this country are unsuitable for small larvae, except in June, July and August. This is especially so with *Gerris najas*, which lives on running water, where the current can easily become too rapid after heavy rains". This may be so, but our streams are often very rapid and turbulent in the late summer and early autumn after heavy storms, and remain so for many days together. He also says, "Pairing may take place some time before actual copulation, and the instances referred to by Butler may be explained in this way. I have," he says, "taken females of this species on June 1st, with the abdomen full of mature eggs, ready to be laid in the next few days". But this does not explain what becomes of those eggs which are laid in August. He also points out that no young larvae have been taken in the early spring, which is certainly against the supposition of their wintering in that state, or even as eggs; but on the other hand no *adults* have ever been found in winter, in a state of hibernation, or otherwise. Butler finds this difficult to account for. March appears to be the earliest month in which they have been found, and it does not seem to me at all improbable that these may breed early and produce a brood in early summer that gives rise to a second generation in July—my late-laying captures. Whether the resulting eggs hatch out and mature before the winter or whether they remain as eggs is uncertain, and further careful investigation seems desirable.—J. E. CAMPBELL-TAYLOR, F.R.E.S.; "Afterwards", Dudsbury Cross, nr. Wimborne, Dorset.

SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, October 2nd, 1935.*—Dr. S. A. Neave, O.B.E., President, in the Chair.—*Election of Fellows.*—The following were elected Fellows of the Society: C. J. Gollidge, 8, Dryden Mansions, Queen's Club Gardens, W. 14; M. S. Mani, Entomological Section, Zoological Survey of India, Indian Museum, Calcutta, India; Geoffrey R. Walker, M.B., Ch.B., D.T.M., The Sir Alfred Jones Research Laboratory, Freetown, Sierra Leone, West Africa. *Obituary.*—The death of Dr. Paul Martin, elected in 1935, W. Ormiston, elected in 1913, and A. H. Swinton, elected in 1876, who at the time of his death was the senior Fellow of the Society, was announced. *Exhibits.*—Dr. O. W. Richards discussed island races of British Humblebees. Dr. L. G. Higgins exhibited the melitaeine butterflies, *Euphydryas wolfsbergi* Frey and *E. desfontainii* Godt., and made remarks on their geographical distribution. Prof. G. D. Hale Carpenter (on behalf of Lieut.-Col. H. F. Stoneham) gave an account of the copulation of *Catopsilia* in the air, and discussed the attraction of *Precis* to *Danaus chrysippus* with its scent brushes extended. Mr. D. S. Wilkinson exhibited *Euphydryas aurinia* (Rott.) from Ireland parasitized by *Apanteles bignellii* Marshall. The President exhibited a photograph of the only portrait of Jacob Hübner known to exist. *Papers.*—The following papers were read: The Rhopalocera of Abyssinia, by Prof. G. D. Hale Carpenter, M.B.E.; The Mutillid Wasps of the Islands of the Pacific Ocean, by Prof. C. E. Mickel, Ph.D.

Wednesday, October 16th.—Dr. S. A. Neave, O.B.E., President, in the Chair.—*Election of Fellows.*—The following were elected Fellows of the Society: Valentine Hugh Wilfred Dowson, Kut As-Sayyid Estate, Basrah, Iraq; Alterbury Coulston Evans, Rothamsted Experimental Station, Harpenden, Herts. *Obituary.*—The death of G. B. de B. Kershaw, elected in 1904, and the Rev. Prebendary A. P. Wickham, elected in 1917, was announced. *Exhibits.*—Dr. F. W. Edwards gave a lecture on the British Museum Expedition to Eastern Ruwenzori, 1934-35, illustrated by lantern-slides. Dr. W. H. Thorpe discussed the biology of *Encyrtus (Comys) infelix*, a remarkable Chalcid parasite of *Lecanium hemisphaericum*.

Wednesday, November 6th.—Dr. S. A. Neave, O.B.E., President, in the Chair. *Election of Fellows.*—The following were elected Fellows of the Society: George Frederic Bartholomeuz, L.M.&S. (Ceylon), D.T.M.&H. (England), The Medical and Sanitary Services, Colombo, Ceylon; Major J. E. Drysdale, Shordale, P.O. Umtali, Southern Rhodesia; G. M. Henry, The Colombo Museum, Colombo, Ceylon; Sheikh Abdur Rashid, 78-A, Model Town, Lahore, India; Charles Roberts, F.R.H.S., Llysmair, Ruthin, Denbighshire; Frank Henry Taylor, The School of Public Health and Tropical Medicine, University of Sydney, N.S.W., Australia; Dr. E. M. Walker, Department of Invertebrate Zoology, University of Toronto, Toronto 5, Canada. *Obituary.*—The death of A. L. Rayward,

elected a Fellow of the Society in 1907, was announced. *Exhibits*.—Sir Edward Poulton, F.R.S., exhibited and discussed (1) a second record of *Callimorpha hera* taken in the Isle of Wight on August 28th, 1935; (2) an aquatic "woolly bear" caterpillar taken at Pleasant Hope, near Paruka, Lower Essequibo River, British Guiana, on May 15th, 1935, by Dr. J. G. Myers; (3) a spider mimicking the ant *Cephalotes atratus*, taken on May 24th, 1935, at Kobarima, N.W. District, British Guiana, by Dr. J. G. Myers; (4) a drawing and description by Mr. F. W. Frohawk of the nest of the wood wasp, *Vespa sylvestris* L., built against a martin's nest, under the gable of the gardener's house at the Experimental Gardens, Wisley (observed on August 9th, 1891, and August 29th, 1935); and (5) notes by Mrs. M. D. Brindley on pied wagtails feeding their young on dragonflies, July, 1935. Prof. G. D. Hale Carpenter discussed (1) dragonflies as enemies of *Glossina*; (2) a Hesperiid emitting fluid from the anus to moisten dung for absorption, observed by Mr. T. H. E. Jackson; and (3) meadow pipits attacking the Magpie moth when unusually abundant in North Uist. Mr. L. Parmenter exhibited and discussed a record of the first male of *Triglyphus primus* Loew (Syrphidae) taken in Britain. Mr. O. H. Latter discussed the reason for the order in which a wasp constructs the cells of a comb, illustrating his remarks with lantern-slides; and a method of computing the number of cells in a comb, and an instance of limitation of the instincts of wasps.—A. W. McKENNY-HUGHES (*Hon. Secretary*).

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*Thursday, October 10th, 1935*.—The President in the Chair.—Mr. Bunnett exhibited the Cassid beetle *Cassida vittata* from Chislehurst, with *C. hemisphaerica* for comparison; Dr. Cockayne, a *Zygæna achilleæ* from Raasay Is. comparable to continental forms; Mr. Hawkins, a fine series of *Bryophila impar*, presented by Mr. Worsley Wood to the Society's cabinet, also *Sarrothripus revayana* and *Eupithecia pimpinellata*; Mr. Niblett, the gall-makers *Myopites longirostris* Lw. bred from *Inula orithmoides* and *Chortophila cinerea* bred from *Senecio jacobaea*; Mr. Eagles, Coleoptera bred from the fungus *Daldinia concentrica*; Mr. Wakely, *Dianthoecciu nana* (*conspersa*), *D. capsincola*, *D. carpophaga* and *Eupithecia venosata* bred from larvae on seedheads of *Silene inflata* and *Lychnis alba*, Chalfont Field Meeting, bred *Enstrotia trabealis* (*sulphuralis*), and *E. luctuosa* taken at light at Upper Norwood; Mr. Moore, *Thesprotea graminis* (Orthop.) from Dunedin, U.S.A., and *Myrmeleon roseipennis* from Indiana; Mr. Jacobs, the fungus *Daldinia concentrica* containing larvae of *Myelois neophanes* from Broadwater Forest; Dr. Bull, second brood *Diacrisia lutea* (*lubricipeda*) and the Homopteron *Ledra aurita*, from W. Kent; Mr. Pinhey, a mantis captured flying at Lyndhurst, New Forest, and larvae and an imago of *Prionus coriarius*; Mr. Bedford, a photograph of a *Catocala faxini* taken in Sussex; Mr. Bunnett, a large number of lantern-slides illustrating micro objects of natural history.—HY. J. TURNER (*Hon. Editor of Proceedings*).

THE ENTOMOLOGIST.

VOL. LXIX.]

MARCH, 1936.

[No. 874

THE LEPIDOPTERA OF CARA ISLAND.

By W. H. DOWDESWELL.

CARA, a small island one mile long and half a mile wide, is one mile due south of the island of Gigha, and about $3\frac{1}{2}$ miles west of Taynloan on the mainland of the Mull of Kintyre. It was last inhabited a year and a half ago, and has since been deserted. A collecting expedition from Oxford University recently spent some sixteen days on the island from June 30th to July 15th, during which time 177 insects were captured, 59 being butterflies and 118 moths. Ten different species of butterflies were found there, and 22 species of moths.

Of the butterflies, *Eumenis semele* occurred in only two localities on the island—on the Mull (due south, 185 ft.), and at a point slightly lower (130 ft.), to the south-west. Its eggs presumably were laid on the coarse grass which abounded in both those places. Its favourite resting-place was on rocks covered with lichen, which were quite plentiful; here it assumed an attitude with its body and wings on one side, and its upper wings tucked beneath the lower ones, so that it became completely invisible. *Maniola jurtina* also proved to be plentiful, occurring in most places on the island below the height of about 100 ft.; it was seldom seen above this height, the reason no doubt being the absence of the finer grasses, which grew only at the lower levels. Six specimens in all were taken, none showing any variation. *Coenonympha pamphilus* proved to be very common in certain places, these being where the rougher heath grasses abounded, at a height of about 100 ft., and in a number of areas near the shore. Nine specimens were taken, mostly in company with *Polyommatus icarus*.

One specimen of *Vanessa atalanta* was captured hovering over nettles to the south-east of the island, and one other was seen. To all appearances these had recently emerged, being in good condition, and must almost certainly have flown over from the mainland three to four miles away. Similarly one specimen of *Vanessa cardui* was taken on the highest part of the island, flying in company with *Eumenis semele*. It was the only one we saw, and was much more worn than the *V. atalanta* taken on the same day. In the middle of the island and in numerous isolated regions on the coast nettles were found, and in these places *Aglais urticae* proved to be quite common, eight specimens being taken. These were all in perfect condition, and it seems likely that they must have emerged

during the days that we were on the island, judging by the comparative rarity of the insect on our arrival and its common occurrence by the time the expedition left. During that time the weather was predominantly hot and sunny, which no doubt hastened the emergence of insects.

One isolated colony of *Nymphalis io* larvae was found in a small bed of nettles at the south end of the island, almost on the edge of a sandy part of the sea-shore. The larvae covered an area of some 3 ft. by 2 ft., and were approximately 70 in number. Three of the largest were taken on July 3rd. These were fed on nettle, and two pupated on July 12th; one emerged on July 24th. It seems likely that this colony of *io* must have resulted from the eggs of a single stray female. No imagines were observed at any time either on Cara, Gigha or the mainland near, nor were any larvae found in other localities on the island. This was, in fact, rather a surprising find, for *Nymphalis io* is generally considered an even rarer visitor to Scotland than *Nymphalis antiopa*. It is interesting to note that Barrett, in his *Lepidoptera of the British Islands* (2: 140), states Moray to be the extreme northern limit of *io*, and records that a brood was found on the Isle of Arran by Thomas Chapman, of Glasgow, in 1880.

Polyommatus icarus occurred more or less all over the island below a height of 120 ft., generally in regions where *Lotus corniculatus* was plentiful. A certain amount of variation was found both in size and depth of wing-marking in both sexes. Altogether we took 15 specimens of this species. Of the Pierinae, *Pieris napi* was abundant, specimens of both first and second broods being on the wing together, the former rather worn, the latter freshly emerged; 11 specimens were taken. The food of these was no doubt *Cardamine pratensis*, which occurred in large quantities in the damper and lowest parts of the island, where the insect could be seen hovering in fine weather. Complete absence of any other Pierines was noticed, although both *rapae* and *brassicae* were found on the neighbouring island of Gigha only a mile north of Cara. Finally, one specimen of *Lycaena phlaeas* was taken while hovering over thistle, almost on the shore, in the neighbourhood of a plentiful supply of sorrel, in a sheltered bay at the south-west end of the island. We also saw two others in similar localities to the north, but could not catch either of them.

Thus, as far as the butterflies are concerned, Cara seems to form an island community with the exception of *Vanessa atalanta*, *V. cardui*, and *Nymphalis io*, the last being indeed an exceptional visitor; the other two probably somewhat commoner migrants from the mainland.

Now, turning to the moths, we found large numbers of *Arctia*

caja, and took 20 specimens. These were seen in many different places all on low ground, and mostly on the sheltered north-east side of the island. One interesting female was found in the grass on the north-east coast without an abdomen; this, no doubt, had been removed by a Meadow Pippit, of which there were numbers on the island. We noticed a good deal of minor variation, especially on the fore wings, no two individuals being the same. One rather worn male *Parasemia plantaginis* was caught, being roused from the grass and heath at a height of about 100 ft., at the south-east end of the island. No other individuals were seen either in this locality or any other. One specimen of *Spilosoma lubricipeda* and three *Spilosoma menthastri* were all caught in the same way, namely by attraction to light. Of these latter three individuals, two females had fore wings of a dull yellow colour, while the third, a male, had white fore wings. The former colour appears to be of quite common occurrence in Scotland, especially in the west. One fairly large larva of *Saturnia pavonia* was found on heath, in much the same place where *P. plantaginis* was captured. This was unfortunately parasitized, and died before attaining the pupa stage.

Of the *Noctuidae*, *Acronycta rumicis* was quite common, coming to the sugar patch frequently, especially when flat rocks were sugared. It was captured only in the northern parts of the island, this being no doubt due to the greater amount of dock and sorrel in that locality. Ten specimens were taken, mostly in good condition, and always in sheltered places. We found one specimen of *Agrotis strigula*, aroused quite accidentally about midday from grass and ling on the side of the Mull, at the extreme south of the island, at a height of about 150 ft. Also a single specimen of *Noctua plecta* was taken. *Mamestra oleracea* was found to be of quite common occurrence, ten specimens being taken, mostly in different places all over the island, except on the highest ground, where no *Noctuids* were found. Its favourite haunt was a piece of sugared board, under a bank, in the middle of the island, near bracken. One specimen of *Apamea gemina* was caught on a flat granite rock which had been sugared. This was in a valley at the south-east, almost on the sea-shore. We also took a specimen of *Miana fasciuncula* on a piece of sugared wood in a damp, grassy valley to the south-west, where there were many rushes. The ground-colour of this individual was dark ochreous on the fore wings, and showed no signs of that much paler and occasionally almost white background sometimes found in Scottish specimens. *Xylophasia monoglypha* proved to be common, and we took 17 specimens. Of these, 10 were caught in one night on the sugared face of a granite rock near bracken, in the centre of the island. Five melanic specimens were found with fore wings almost black, and little

marking. The others showed a good deal of variation in colour, and, to a lesser degree, in marking also. Another common sugar-patch visitor was *Euplexia lucipara*, of which we took 10 specimens altogether, mostly in excellent condition. All these were caught in the south and centre, generally near bracken, the moth being apparently absent in the north. Five specimens of *Leucania impura* were captured. One of these was in the big valley at the south-east on a sugared board near rushes, and the other four in a similar locality on the west of the island, again low-lying, and with many rushes.

By far the most interesting of all the Lepidoptera taken on Cara was a melanic female form of *Caradrina taraxaci*, which has since been very kindly identified by Mr. W. H. T. Tams at the Department of Entomology of the British Museum. This moth was of normal size, and had fore wings of a blackish colour with hind wings a lighter shade of the same colour tinged with brown. The marking on the fore wings was much suppressed and very indistinct. It was taken on a sugared piece of wood in a damp, rushy valley to the south-east, and was the only one found, no other species of *Caradrina* being taken at any time. This melanic form seems to be of very rare occurrence. Barrett (5:290) records the only indication that I can find of its previous capture; he describes a specimen in the collection of Mr. S. Stevens as having fore wings which were nearly black.

One specimen of *Abrostola tripartita* was taken on a warm evening in the centre of the island. This was found hovering over a patch of sorrel and ragwort. Of the *Geometridae*, one very worn specimen of *Xanthorhoë montanata* was caught, being roused from long grass. Also a single *Xanthorhoë sociata* was found in similar vegetation. *Camptogramma bilineata* occurred in very large numbers in any locality where there was bracken, in fact over most of the island except on the sea-shore. We took 12, and these showed a good deal of variation in the ground-colour of the wings and in intensity of marking. In the majority the central band on the fore wings was a dark brown colour, though in a few this was much lighter. We captured two specimens of *Eupithaëcia satyrata*, both on the wing, hovering over flowering ling. This was on the Mull, at the extreme south of the island, being the highest point (185 ft.). Both specimens were in good condition, and of a brownish-grey colour. No others were recorded on any part of the island. *Eupithaëcia absinthiata* was also found, only one specimen, however, being taken.

Lastly, *Hepialus fusconebulosa* was common, though apparently confined entirely to the north and central parts, no specimen being taken in the south. The explanation of this seems to be rather

obscure ; it certainly cannot have anything to do with vegetation, for bracken, the food of the larva, occurred all over the island. Nor was the north any more sheltered than the south. It is indeed extraordinary that a species should be so common in one part and yet absent in another, where there is apparently no difference in either climate or vegetation. Of the 18 specimens taken, less than half were found on the sugared sides of granite rocks. The rest were taken at dusk, hovering over sorrel near our camp, on the central plateau of the island ; the smell of boiling cocoa seemed to have a particular attraction for them !

Thus, in the moths, even more than the butterflies, Cara appears to form a complete island community, for, as can be seen from this description, where a moth is found to occur, so there, or near by, is the natural food of its larva also.

VANESSA ATALANTA HIBERNATING IN YORKSHIRE.—The Red Admiral under observation in Flamborough Church from November to April, 1935 (*Entom.*, 69 : 3), was occasionally active, and during one evening service in February was seen fluttering round a lamp. I last saw it on Easter Sunday, April 21st, resting on Cinerarias decorating the altar, and upon which it may have fed. It then appeared remarkably fresh and flew strongly, but there was no opportunity to examine it closely to determine the sex. The conditions in the church cannot be considered natural, as little sunlight can penetrate, and from Friday evenings to Monday mornings central heating raises the temperature in winter.—C. W. V. GANE ; Marton Hall, Bridlington.

MISELIA OXYACANTHÆ VAR. CAPUCINA.—I am very interested in the variety of *Miselia oxyacanthæ* L., described by Millière as var. *capucina*, and wish to gain information concerning its distribution in the palaearctic region. As far as I can ascertain this melanic race is strictly limited to England, does not occur in Scotland, and very doubtfully in Ireland. Said to be as common as typical *oxyacanthæ* in Essex (Mucking, Burrows), and generally prevalent in the Midlands. Here in the Cotswolds, Bourton-on-the-Water, out of 516 observed at sugar during the last ten years, I noted 445 typical and 71 var. *capucina*, a percentage of 13.75. I would be much obliged for notes concerning the existence of this variety in England and Wales further north than Kendal, Westmorland, and Ripon, Yorks, and further west than Ruthin, Denbigh, Abertillery, Mon., and Start Bay, Devon. By *capucina* I mean the variety having the colour a deep carmelite brown, the green scales absent except fine and slight traces on the ordinary median lines, but the pale mark formed by the lower part of the elbowed line standing out conspicuously in clear white. This is an adaptation of Millière's description in his *Iconographie*, etc., 3 : 165.—C. DONOVAN, Lt.-Col. I.M.S. (ret.) ; Bourton-on-the-Water, Glos, February 6th, 1936.

THE GREAT FROST OF MAY, 1935, AND ITS EFFECTS ON BUTTERFLY LIFE.

BY BRIGADIER-GENERAL J. B. G. TULLOCH.

It is indeed unfortunate that in No. 868 of the *Entomologist* Mr. H. W. Head should have decided in his article, "Where do Red Admirals go to in the Winter?" that they die during that period. On August 24th Mr. F. W. Frohawk published an article in the *Field* which proved that they sometimes hibernate and live! When two such eminent entomologists differ on the subject, what chance has a mere dabbler in entomology for fifty-five years like myself of arriving at any conclusion?

But as Mr. Frohawk has now come down definitely on my side, I stick to my original contention that *Vanessa atalanta* lives through the winter, and then reproduces its species after hibernation in the same way as *V. io*, *Aglais urticae*, etc. I go further than Mr. Frohawk and Mr. Head, and maintain that not only does *atalanta* hibernate, but that the late summer and autumn specimens are native born and bred, and are not necessarily the result of alien immigration, and I now produce a point for consideration in support of my theory.

Everybody, whether in the town or country, has heard of the great frost of mid-May, 1935. This frost was one of the most sudden and severe ever known for May. In one night it destroyed the whole apple crop of this and every adjoining county. Also all plums and strawberries were killed, whilst ash, oak, chestnut, beech and other trees had in many instances their foliage blackened to such a degree that ash and walnut trees lost every leaf. The damage, so far as vegetation is concerned, has been partly made good by Nature by means of a fresh crop of leaves, but no fruit.

But the butterflies on the wing suffered worse than the trees. They were all completely destroyed in this neighbourhood. I found dead white butterflies in the garden. All the hibernating species which had appeared in numbers as usual between March and May, *i.e.* *V. io*, *Aglais urticae* and *Gonepteryx rhamni*, were gone in a night, and incidentally any *atalanta* must have gone also. I have been twice to a field near here, which is the best in the district entomologically; its usual late summer and early autumn population consists of such quantities of butterflies that in previous years I have seen *io*, *atalanta*, *urticae*, and *Polygonia c-album*, etc., literally fighting for place on flower-heads. But on August 22nd, a perfect day, the total butterfly population was 2 *urticae*, 1 *Vanessa cardui* (very fresh), 1 *rhamni*, 1 *Plusia gamma*, and a few *Lycæna phlaeas* and *Polyommatus icarus*. On September 3rd, south-west wind very warm and damp atmosphere, the same field produced 5

urticae, 2 *Pieris napi*, 1 *Argynnis paphia*, 2 *Pararge aegeria* and a few *L. phlaeas* and *P. icarus*. There was not a single *io*, *atalanta* or *c-album*. Up to date my garden, which usually contains dozens of all three, has produced 1 *io*, 9 *atalanta*, a few *urticae*, and no *c-album*. But, says Mr. Frohawk, the immigrant *atalanta* arrive in May and June. If that were so, then they would have arrived after the great frost, and there would be the usual number of *atalanta* about. But it is not so here at all events, and the only conclusion I can arrive at is that our native stock of *atalanta* is dependent wholly or in great part on hibernated specimens, and that the great frost killed off the majority. Some people may say why are *urticae* about? The answer is that they are very hardy. They can stand the climate of North Ireland and Scotland, and that is saying a lot!

I am afraid that Mr. Head's experiments with *atalanta*, *cardui* and *Macroglossum stellatarum* in glass-houses are of little practical value. *V. atalanta* flies in Malta at a temperature that Mr. Head might find very inconvenient, whilst *stellatarum* delights in flying up and down the very hottest stone walls and banks it can find. A *Macroglossum*, very first cousin to *stellatarum*, lives in Mauritius, and I used to see it flying in the hottest part of the day in the hottest month with a temperature of 80°-90°.

It is quite true that some butterflies rest during the hottest period of some particular day. I have seen large butterflies of the genera *Euploea* and *Hypolimnas* take shelter in scorching heat under large leaves, but they do not migrate because of the temperature. As for *cardui*, I do not believe that its natural habitat is Southern Europe. The following are places, and temperatures, where I have seen *cardui*: North-West Frontier of India, temperature 60°-70°, Transvaal 70°-80°, Mauritius 80°-90°, South China 90°-100°, India 100° and upwards. In India in the hot weather I have seen them in myriads, so plentiful that large lizards, a foot long, used to climb up bushes and lie out amongst the flower-heads to catch them. In fact I saw one butterfly arriving from outside at a bush go straight down a lizard's throat without a split second of hesitation! In all the above instances the *cardui* were living a normal butterfly life, and there was no suggestion of any migration. In fact, like sailors—Painted Ladies don't care!

Hill Court,

Abergavenny;

September 14th, 1935.

PONTIA DAPLIDICE IN ESSEX.—Capt. Dannreuther informs me that a female *P. daplidice* was captured at Shopland, near Southend, Essex, by Mr. H. R. Sweeting on August 26th, 1935. It was in a lucerne field; and the identification is vouched for by Mr. H. C. Huggins.—N. D. RILEY.

NOTES UPON SOME BUTTERFLIES FROM SIAM, WITH
DESCRIPTIONS OF NEW RACES AND FORMS (LEP.
RHOPALOCERA).

By G. TALBOT, F.R.E.S.

Two collections from Siam, containing many interesting species, have been recently presented to the British Museum by Messrs. D. M. Davidson and J. Macbeth. The specimens were obtained in North, East and Central Siam, and all are now placed in the British Museum collection.

Three races and one form are here described as new, also the sexes, not known previously, of two other species. Opportunity is also taken to describe the male of *Spindasis vixinga* Hew. from Sumatra.

Family PIERIDAE.

1. *Delias thysbe thysbe* Cram.

This species was said to come from "China", but no specimens have since been recorded from there. The type probably came from Tonkin, as specimens from there agree with Cramer's figure, especially in the white anal area of hind wing above. A specimen taken at Chentaboon by Mr. Macbeth is the same.

Family NYMPHALIDAE.

2. *Euthalia adonia beata* Fruhst. ♂.

The type of this race is a ♀ and the ♂ has apparently not been described. It differs from other known races of *adonia* in the absence of the small white spots on both sides of the fore wing. In one specimen the two subapical dots in cellules 6 and 8 are still present. The fore wing above is less darkened than in *montana* Fruhst. from Borneo, from which it differs also on the hind wing in the much narrower band of discal spots and scarcely darkened proximal area. Underside of hind wing with the red discal spots smaller than in *montana*, and the bluish-green anal area reduced to a narrow submarginal band reaching to about vein 4.

♂. Neallotype from North Siam: Me Haht Forest, 4.iii.1934. Also a second and worn specimen taken at the same place on 10.iii.1934. Both collected by D. M. Davidson.

3. *Euthalia kesava discispilota* Moore.

The type of this race is a ♀. It is distinguished by the narrower discal band on fore wing; the edges of this band are only slightly dentate, and rarely marked with white, the band being a little paler brown than the proximal area. A whitish discal spot in

cellule 3 and another in 6 are usually prominent, and sometimes smaller brownish spots in 2, 4 and 5.

The ♂ does not appear to differ from typical *kesava*, except that it usually shows on the fore wing a small but prominent white spot at the base of cellule 3; this is rarely seen in the nominotypical form.

In the British Museum from Lower Burma and Siam. Both sexes were obtained by E. J. Godfrey and Major Stockley in Siam; only males were received from Mr. Macbeth.

4. *Euthalia jahnu jahnides* Fruhst.

This race was described from Tonkin, and also occurs in Siam according to Fruhst. The ♂ and 2 ♀♀ from Chentaboon (J. Macbeth) are dark, with the ♀ showing strong white scaling on fore wing above. The British Museum series shows a dark and a light form in both sexes, which may be seasonal.

5. *Pantoporia selenophora latifascia* ssp. nov.

Fruhstorfer (Seitz, 9: 631) treats the specimens from Burma, Karen Hills, Shan States, Siam and Tonkin as one race under the name *bahula* Moore. The type of this name is a ♀ from Silhet; it sinks to *selenophora* Koll. A new name is required for the race indicated.

♂. Upperside with larger white subapical spots and wider discal band than is usual in nominotypical specimens.

Underside markings as above, and in addition the submarginal band on hind wing usually more prominent.

♀. Burma specimens in the British Museum do not appear distinct from Sikkim specimens, though Burma males resemble the Siam ones.

This race is only slightly differentiated.

The Siam specimens in the British Museum comprise 2 ♂♂, 1 ♀ collected by Major Stockley, and 2 ♂♂ collected by Mr. Macbeth.

6. *Charaxes polyxena agna* Moore.

Specimens of this race from Burma show much variation in size and markings. The specimens in the Siam series taken by Mr. Macbeth appear to be of smaller size, but similar examples occur in the Burma series, and there is also a similarity in the variations in markings.

Family SATYRIDAE.

7. *Elymnias patna stictica* Fruhst.

There are 3 ♀♀ of this Tonkin race in the British Museum. The Siam ♂, taken by Mr. Macbeth, differs from these in the shorter

and narrower blue streaks on fore wing, and the white spots on both wings are reduced to dots. The specimen is best treated as *stictica* until it can be compared with the Tonkin ♂, or until a ♀ is available from Siam.

Family RIODINIDAE.

8. *Zemeros phlegyas allica* Fabr. (dry-season form *pullus* nov.).

The name *allica* Fabr. was founded upon the wet-season form. The dry form differs in the less defined markings above, and duller coloration. The two white subapical spots on fore wing are larger on both sides. The post-discal band on hind wing below is indistinct, the spots forming it being brown like the rest of the wing, and not blackish brown as in the wet form.

Described from Siam specimens. N. Siam : Doi Sutep, Chiang-mai, 27.xii.1933, 1 ♂ (D. M. Davidson) (type). W. Siam : Upper Mekong, 1500 ft., 13.i.1924, 2 ♂♂, 1 ♀ (Major C. H. Stockley).

Family LYCAENIDAE.

9. *Semanga superba* Druce, *siamensis* ssp. nov.

This species was known previously from Borneo (typical), Sumatra, Java and Banggai, and has been taken by H. M. Pendlebury and Brig. W. H. Evans in the Malay Peninsula and the Mergui Islands. A male and three females taken by Evans in Malaya are in the British Museum. In the British Museum there are also a female labelled "Singapore" and a female labelled "India"; both these agree with a female labelled "Sumatra". There is also a female labelled "Java", and Druce's type from Borneo, which is also a female. The Siam ones differ quite distinctly from those noted above.

♂. This sex is extremely rare, but we are able to compare it with the Malaya male noted above. Fore wing with the blue a little more extended than in the Borneo female, but to a less extent than in the Sumatra female, its edge straight from v. 2 to the inner margin, the black margin here being 2 mm. in width. In the Malayan male the blue is much more extended and is darker. A rounded patch of darker blue forms a sex-patch, which occupies the outer two-thirds of the cell, and extends a little below the cell and into cellule 2. In the Malayan male this patch is rather less distinct.

Hind wing with less blue than in the Malayan male, and with wider dark borders. The dark costal area reaches the fold in cellule 5, and includes the upper part of cell. The yellow-brown submarginal spots placed on the edge of the blue area are much larger than in the females noted, or in the Malayan male; there are 4

spots in cellules 3-6, the one in 5 larger than the others, and the one in 6 placed close to the margin. The 3 posterior yellow-brown spots are as large as in the females noted, and as conspicuous as the anterior spots.

Underside very similar to the Malayan ♂ in colour and markings; there is no difference which can be described.

♀. Upside of fore wing resembles the ♂, but is without the sex-patch. Hind wing as in the ♂, but the blue area is absent from the lower edge of cell, and the yellow-brown spots are still more conspicuous, forming also an edging to the blue as far as the anal spot. Underside as in the ♂.

Length of fore wing: ♂ 15 mm., ♀ 16.5 mm. Expanse: ♂ 32 mm., ♀ 35 mm.

Habitat.—Siam. Type ♂ from North Siam: Koon Tarn, 9.v.1933 (D. M. Davidson). Allotype ♀ from Chentaboon, Khao Sabap, February, 1934 (J. Macbeth). Also a second ♂ from Koon Tarn, 30.iii.1933 (D. M. Davidson).

10. *Spindasis vixinga* Hew., ♂.

Aphnaeus vixinga Hew., 1875, Ent. Mo. Mag., 12: 39 (Borneo), ♀.

Syn.: *Aphnaeus hiendlmayrii* de Nicév., 1894, Journ. As. Soc. Beng., 63 (2): 38, pl. v, f. 5, ♀ (Sumatra).

The ♂ of this extremely rare species does not appear to have been described. Hewitson's type, in the British Museum, is a ♀. The three specimens recorded by de Nicéville as *hiendlmayrii* were stated to be females. The single ♂ now in the British Museum was presented by Brig. W. H. Evans, and is labelled "Sumatra". I am also indebted to Brigadier Evans for making a close examination of the specimen with the microscope and for the determination of the sex.

Upside of fore wing with the discal spot reduced to an obscure line on the cross-vein.

Hind wing as in the ♀.

Underside markings as in ♀, but smaller and with darker red-brown ground-colour. On both wings the darker red brown of the outer marginal area contrasts with the paler proximal area. Fringes fuscous in the ♀.

Length of fore wing 17 mm.; expanse 37 mm.

Habitat.—Sumatra, one ♂ *ex coll.* Evans.

11. *Spindasis vixinga* Hew. *davidsoni* ssp. nov.

♀. Upper side of fore wing with the creamy-white discal spot rounded and much larger than in typical *vixinga*; this spot is placed on the cross-vein and the greater part of it lies outside the cell. Hind wing at the anal angle with a small rufous spot only,

not a patch; the lobe edged with black, continued as a black marginal line, which thins out and reaches vein 6.

Underside differs from the nominotypical form in several details. The rufous proximal areas contrast with creamy-buff distal areas, and the spots are larger, rounded and snow-white without gloss, excepting some metallic scaling on the costal and submarginal spots. Fore wing with a narrow brown marginal band, which is thinly edged with black on the inner side, this edging being interrupted to form 5 black dots and marks. Hind wing between vein 1b and 7 with a black post-discal line formed of spots, which are small in cellules 1c, 2 and 3, large and square in 4 and 5, in 6 small and mostly overlaid by a metallic silvery spot; the spots in 4 and 5 are distally bordered with brown, the whole representing the brown patch seen in the nominotypical form. The distal marginal area is pale buff. A small black submarginal spot in 6; a row of 4 submarginal thin black semi-lunate marks; an oblong black submarginal spot in 1c; a fine white antemarginal line, and a black marginal line of the same width; anal lobe black. The transverse line from the inner margin to vein 2 is metallic bluish-white; the space in 1c between this line and the black spot is filled in with rufous, and between this and the inner margin the distal area is pale buff. Fringes of both wings white, and on the underside with the proximal half pale brown.

Length of fore wing 22.5 mm.; expanse 49 mm.

Habitat.—North Siam: Prayao, 10.iii.1933, 1♀ (D. M. Davidson).

SESIA MYOPAEFORMIS FEEDING IN *CRATAEGUS OXYACANTHA*.—In connection with the note by E. W. Classey (*Entom.*, 68 : 218) under the above heading, it may be of interest to recall that Knaggs recorded this species in hawthorn (*E. M. M.*, 5 : 78) at Kentish Town in 1868. There used to be a well-known colony in Hyde Park, and I took the species at Wimbledon in 1925.—(Fleet-Paymaster) T. BAINBRIGGE FLETCHER; Rodborough Fort, Stroud, Glos.

CELERIO GALII ROTT. IN THE TEAM VALLEY, NORTH DURHAM.—As errors have crept into Capt. T. Dannreuther's Migration Records (*Entom.*, 68 : 257) in respect to this species, it seems necessary that they should be corrected at once. Actually the facts are simple. On Sunday, August 18th, Master Arthur Bolton, the son of the local schoolmaster, brought a larva of that species to me for inspection; next day he captured two more on the same patch of willow herb (*Epilobium angustifolium*) in some brick-works, near Birtley Station. Subsequently my brother Jack found three and myself two. The whole of the eight pupated successfully. Later, on Tinkler Fell, two or three miles away, another larva was taken, as it fed on heath bedstraw (*Galium saxatile*), by a Sunnyside collector; of its fate I have no record.—(Dr.) GEORGE HESLOP HARRISON.

YELLOW *PIERIS NAPI* : A BREEDING EXPERIMENT.

BY J. SHEPHERD.

IN the *Entomologist* for June, 1934 (67 : 138), there is a note by Lt.-Col. Donovan in which it is alleged that the Irish aberration of *Pieris napi*, which is sulphur yellow above and below and is referred by him to ab. *sulphurea* Schöyen, is an artificial product. No real evidence appears to be given in support of this assertion, but there is an account describing how yellow forms were obtained by staining dead specimens with picric acid. Col. Donovan's suggestion, however, cannot be accepted. Possibly he obtained some sort of an imitation, nothing more. There is abundant evidence that numbers of the yellow aberration have been bred, and at least one, presumably caught, sent from co. Donegal. It seems almost incredible that anyone should be impressed by the suggestion, yet one of Mr. Head's correspondents seems to have been sufficiently taken in to accuse him of this artificial coloration. An account giving details of results obtained from breeding this insect during 1934/5 may therefore be of interest.

In case my reference to articles appearing so long ago may appear belated, I would mention that it takes a considerable time to breed a number of consecutive generations, and I considered it advisable to wait until all chances of any further emergence in 1935 had passed. The origin of the aberration bred by Mr. Head and known as ab. *citronæa* has already been given (see *Entom.*, 68 : 51). It can be described as having the normal pattern, but the ground-colour of the upper- and undersides of both pair of wings citron yellow, the discal area on the underside of the fore wings slightly paler than the upperside, hairs on thorax pale yellow, body blackish, wing markings in the summer or autumn broods pure black, in the spring brood sometimes grey, nervures of underside of hind wings olive, fainter in the summer brood.

This description is taken from 22 bred specimens in my possession.

Early in June, 1934, I obtained from Mr. Head ova from his Donegal stock, and the result was a partial emergence during the following August with all typical white *napi*. These were paired, and the larvae that resulted duly pupated and passed the winter in that state. There was a complete emergence at the end of April, 1935, with typical white *napi*, *three yellow males* and *two yellow females*. These were paired as follows : white ♂ × white ♀ ; yellow ♂ × white ♀ ; white ♂ × yellow ♀ ; yellow ♂ × yellow ♀. Unfortunately the last pairing gave no result, as the female damaged her wings and did not lay. From all the other

pairings there was a complete emergence during June, 1935, with all typical white *napi*. These were paired, and from them I obtained a large number of larvae, but the autumn emergence was only partial, and amongst the few that emerged was *one yellow male*. The remainder are passing the winter in the pupal state, and I hope to report on them later.

The insects were reared on growing plants of *Sisymbrium alliaria* under natural conditions, except for the tiffany covering on the cages, and were not tampered with in any way.

During the years 1926-30 I bred large numbers of *Pieris napi* from Fermanagh stock. It is not necessary to relate the object for which they were bred, but it certainly was not with the idea of obtaining yellow specimens. On June 29th, 1929, a female emerged with yellow upper- and undersides, distinctly ab. *sulphurea*. The 22 examples previously mentioned were bred during the years 1927, 1933 and 1934.

It will be seen that this yellow aberration is genuinely bred, and any suggestions that it is an artificial product obtained by staining dead butterflies' wings is utter nonsense.

Schöyen's ab. *sulphurea* was named from a single male specimen in Prof. Esmark's collection and is described as a male of the autumn generation, distinguished by the sulphur-yellow colouring on the upper- and undersides of both pairs of wings. Apart from this the colouring, wing-marking, etc., are normal. Further reference to the specimen states: The male under consideration is a *pure* sulphur yellow. Unless it is permissible to borrow a name and apply it to a form different from the one to which it was originally given, examples with a vivid sulphur or canary-yellow colour under Schöyen's *sulphurea* appear to be wrongly labelled. A letter received in reply to my inquiry gives the following information: In the Hope Department at Oxford there are no *P. napi* labelled ab. *sulphurea* Schöyen. There are, however, nine yellow forms and the data are as follows:

♂	bred vii. 1916,	Donegal strain.	
♂	Donegal, 1912,	A. S. Tetley.	
♂	bred vii. 1917,	Donegal strain,	Head.
♂	" vii. 1917,	"	"
♂	" vii. 1916,	"	"
♂	" vii. 1917,	"	"
♀	" v. 1920,	"	"
♀	" vi. 1920,	"	"
♀	" v. 1919,	"	"

These, if correctly placed, come under ab. *citronæa* Head. All of them, however, are labelled ab. *flava* Kane, with references to

the *Entomologist* (26 : 119, 33 : 328, 34 : 456). This is clearly an error in labelling, as the abs. *citronæa* and *flava* are separate aberrations markedly different one from the other. A perplexing position is thus reached. One must assume that the ab. *citronæa* labelled as ab. *flava* are the ab. *sulphurea* of Lt.-Col. Donovan, unless there are in the Hope Department at Oxford some true ab. *sulphurea* Schöyen not listed above.

"Sylvanus,"
Queensbridge Drive,
Herne Bay,
Kent.

IMAGINAL TRICHOPTERA APPARENTLY FEEDING.—I made a most important Trichoptera observation when in France in 1934. Trichoptera are not supposed to feed, having no developed mouth-parts. Nevertheless there is a suspicion that they may be able somehow to partake of liquid or semi-liquid nourishment, as lepidopterists have taken them at sugar at night. My observation is this : I was sitting on a rock with, just in front of me, one of the large yellowish-white gentians with huge wads of immense florets, when a Trichopteran of the genus *Drusus*, which I have since described as *Drusus nigro-rectus* (1935, *Trans. Roy. Ent. Soc. Lond.*, 83 : 558), settled on the plant and proceeded to search each flower, descending to the base of each cup and pressing, presumably, its labium first on one side and then on the other, moving about the while, just as a fly would when using its proboscis. I watched it go from one floret to another for at least ten minutes, and have no doubt whatever that it was actually feeding on the nectar of the flower.—MARTIN E. MOSELY ; 43, Lansdowne Crescent, W. 11.

VANESSA CARDUI IN JANUARY.—On January 17th this year, at St. Mary's, Scilly Isles, Mr. R. Trotter captured a *V. cardui* which flew in through a shop window. There was a cold N.E. wind blowing at the time, with showers of hail, although the previous days had been not quite so cold, but dull. The specimen was a small male in fairly good condition. It reached me alive, and after feeding it on January 20th, it was sent on to Dr. C. B. Williams, at Rothamstead. It survived, however, only till January 29th, being kept till then in an indoor insectary under natural conditions, which, however, were severe, as there was snow on January 24th to 26th.—(Capt.) T. DANNREUTHER, R.N.

LATE APPEARANCE OF PIERIS BRASSICAE LARVAE.—It may interest Brigadier-General Tulloch (cf. *Entom.*, 69 : 6) that on January 4th, 1908, at Rayleigh, Essex, I found three larvae of *P. brassicae* which had apparently just crawled up a timber building to pupate. There were 8 degrees of frost at the time, and it had been freezing since January 1st, yet all three successfully pupated.—F. W. FROHAWK.

NOTES ON BRACONIDAE: XV.—MICROGASTERINAE.

BY CLAUDE MORLEY, F.R.E.S., F.G.S., F.Z.S.

(Continued from p. 42.)

- (24) 37. Hind femora black throughout, or rarely laterally testaceous.
- (39) 38. Mesonotum and scutellum shining, smooth and subimpunctate 18. *sericeus*, Nees.
- (38) 39. Mesonotum and scutellum less nitidulous, with puncturation always visible.
- (41) 40. Two basal abdominal segments very nearly smooth 10. *bignelli* (*bis*).
- (40) 41. Two basal abdominal segments always distinctly rugose.
- (49) 42. Hind calcaria neither thick nor longer than half metatarsus.
- (46) 43. Second abdominal segment distinctly shorter than third.
- (45) 44. Stigma and nervures pale piceous; length only 2 mm. 19. *geryonis*, Msh.
- (44) 45. Stigma and nervures nigrescent; length fully 3 mm. 20. *zygaenarum*, Msh.
- (43) 46. Second abdominal segment as long as the third, or nearly so.
- (48) 47. Mesonotum dull with only basal angles nitidulous 21. *spurius*, Wsm.
- (47) 48. Mesonotum nitidulous, though punctate throughout 22. *cleoceridis*, Msh.
- (42) 49. Hind calcaria both thick and longer than half metatarsus.
- (51) 50. Stigma very distinctly whitish towards its base 23. *jucundus*, Msh.
- (50) 51. Stigma not appreciably paler towards its base.
- (55) 52. Wings evidently somewhat infumate throughout.
- (54) 53. Length $2\frac{1}{2}$ mm.; ♀ hypopygium distinctly exserted 24. *cajae*, Bché.
- (53) 54. Length 3 mm.; ♀ hypopygium not at all exserted 25. *jumperatae*, Bché.
- (52) 55. Wings entirely hyaline throughout.
- (57) 56. Second abdominal segment a trifle shorter than third 26. *difficilis*, Nees.
- (56) 57. Second abdominal segment evidently as long as third.
- (59) 58. Metathorax bearing a carina; stigma rufescent 27. *gracilis*, Curt.
- (58) 59. Metathorax bearing no carina; stigma piceous.
- (61) 60. Basal segment distinctly longer than broad; length $2\frac{1}{2}$ mm. 28. *placidus*, Hal.
- (60) 61. Basal segment subquadrate; length at most $1\frac{1}{2}$ mm. 29. *nothus*, Rnh.

- (1) 62. Second segment always very much shorter than third; terebra strongly exserted.
- (84) 63. All femora testaceous, the hind ones but rarely subinfusate.
- (71) 64. Coxae totally or partly testaceous.
- (66) 65. All the coxae entirely pale throughout 30. *laetus*, Msh.
- (65) 66. At least the hind coxae more or less black.
- (68) 67. Stigma testaceous; terebra $\frac{1}{4}$ of abdominal length 31. *punctiger*, Wsm.
- (67) 68. Stigma dark piceous; terebra nearly abdominal length.
- (70) 69. Antennae entirely black throughout; length $3\frac{1}{2}$ mm. 32. *adjunctus*, Nees.
- (69) 70. Antennae red on underside; length at most $2\frac{1}{2}$ mm. 33. *lictorius*, Rnh.
- (64) 71. All the coxae totally black throughout.
- (73) 72. Third segment rugose, at least towards its base 34. *scabriculus*, Rnh.
- (72) 73. Third segment entirely smooth, without rugosity.
- (77) 74. Tegulae totally testaceous or clear brunneous.
- (76) 75. Stigma entirely unicolorous brunneous throughout 35. *falcatus*, Nees.
- (75) 76. Stigma always distinctly pale towards its base 36. *hoplites*, Ratz.
- (74) 77. Tegulae totally dead black throughout.
- (79) 78. Abdomen compressed, cultriform; hypopygium exserted 37. *cultrator*, Msh.
- (78) 79. Abdomen not compressed nor the hypopygium exserted.
- (81) 80. Mesonotum subglabrous and hardly punctate at all 38. *decorus*, Hal.
- (80) 81. Mesonotum very densely punctate throughout.
- (83) 82. Stigma unicolorous, pale brunneous 39. *ultor*, Rnh.
- (82) 83. Stigma basally pale, otherwise dark brunneous 40. *dilectus*, Hal.
- (63) 84. Hind femora black, rarely dull rufescent apically and laterally.
- (86) 85. Hind coxae distinctly rufescent 41. *suevus*, Rnh.
- (85) 86. All the coxae entirely black throughout.
- (90) 87. Stigma pure flavous, diaphanous and translucent.
- (89) 88. Second segment subrugulose, at least towards base 42. *contaminatus*, Hal.
- (88) 89. Second segment entirely smooth throughout 43. *xanthostigmus*, Hal.
- (87) 90. Stigma testaceous or piceous, more or less dark.
- (94) 91. Basal segment nearly thrice longer than broad (cave no. 171 post).
- (93) 92. Both the basal segments smooth and nitidulous 44. *exilis*, Hal.

- (92) 93. Both the basal segments rugulose and distinctly dull
45. *butalidis*, Ms
- (91) 94. Basal segment rarely twice longer than broad.
- (100) 95. Front of head and mouth parts peculiarly elongate.
- (97) 96. All the wings entirely hyaline throughout
46. *longipalpis*, Rn
- (96) 97. Wings evidently a little infumate throughout.
- (99) 98. Metanotum carinate; basal segment quite smooth
47. *vipio*, Rn
- (98) 99. Metanotum not carinate; basal segment aciculate
48. *naso*, Ms
- (95) 100. Mouth parts of the normal dimensions.
- (122) 101. Basal segment rugulose and dull throughout.
- (113) 102. Second segment also rugulose.
- (106) 103. Stigma very distinctly pale at its base.
- (105) 104. Body extending to the length of four millimetres
49. *praetor*, Msl
- (104) 105. Body never longer than two and a half millimetres
50. *emarginatus*, Nees
- (103) 106. Stigma unicolorous throughout, not basally paler.
- (108) 107. Third segment also entirely or basally rugulose
51. *nanus*, Rnh
- (107) 108. Third segment entirely smooth throughout.
- (110) 109. Mesonotum strongly punctate apically; terebra
 $\frac{2}{3}$ abdomen 52. *obscurus*, Nees
- (109) 110. Mesonotum subglabrous; terebra $\frac{1}{4}$ abdominal length.
- (112) 111. Basal segment hardly longer than broad; ♀ sheaths
linear 53. *tenebrosus*, Wsm
- (111) 112. Basal segment twice as long as broad; ♀ sheaths
claviform 54. *viminetorum*, Wsm
- (102) 113. Second segment smooth, not at all rugulose.
- (119) 114. Wings hyaline or lacteous, not at all infumate.
- (116) 115. Stigma testaceous with a distinctly darker border
55. *sodalis*, Hal
- (115) 116. Stigma unicolorous, piceous or nigrescent.
- (118) 117. Basal segment subquadrate; length $3\frac{3}{4}$ mm.
56. *albipennis*, Nees
- (117) 118. Basal segment half as long again as broad; $1-2\frac{1}{4}$ mm.
57. *impurus*, Nees
- (114) 119. Wings distinctly a little infumate throughout.
- (121) 120. Second segment $\frac{1}{4}$ length of third; terebra $\frac{1}{4}$
abdomen 58. *onomidis*, Msh
- (120) 121. Second segment $\frac{1}{2}$ length of third; terebra $\frac{1}{2}$
abdomen 59. *infimus*, Hal
- (101) 122. Basal segment smooth or only apically subrugulose.
- (124) 123. Wings dark brown; hind legs entirely black
60. *gagates*, Nees
- (123) 124. Wings not infumate; hind legs partly testaceous.
- (128) 125. Stigma both testaceous and brown, particoloured.

- (127) 126. Wings entirely white ; terebra length of abdomen
61. *halidaii*, Msh.
- (126) 127. Wings hyaline ; terebra but a quarter of abdomen
62. *coniferae*, Hal.
- (125) 128. Stigma unicolorous, fulvous or piceous or nigrescent.
- (132) 129. Hind femora black, always marked with testaceous.
- (131) 130. Stigma dull piceous ; length fully $3\frac{1}{2}$ mm.
63. *lineipes*, Wms.
- (130) 131. Stigma dull testaceous ; length only 3 mm. (not
British) *lineatus*, Rnh.
- (129) 132. Hind femora entirely black throughout, immaculate.
- (134) 133. Stigma clear fulvous 64. *chrysostictus*, Msh.
- (133) 134. Stigma dull piceous.
- (140) 135. Postpetiole of uniform breadth throughout.
- (137) 136. All the alar nervures very definitely indicated
65. *sicarius*, Msh.
- (136) 137. All the alar nervures mainly pellucid or fenestrate.
- (139) 138. No fovea before scutellum ; terebra as long as
abdomen 66. *longicaudis*, Wsm.
- (138) 139. Distinct fovea before scutellum ; terebra $\frac{1}{2}$ abdomen
67. *fuliginosus*, Wsm.
- (135) 140. Postpetiole apically contracted from its centre.
- (142) 141. Metanotum not carinate ; terebra half abdominal
length 68. *corvinus*, Rnh.
- (141) 142. Metanotum centrally carinate ; terebra equals
abdomen 69. *merula*, Rnh.
- (0) 143. Basal segment always very distinctly longer than
broad.
- (157) 144. Apex of basal segment truncate, not laterally
contracted, half as long again as broad ; terebra
quite short.
- (148) 145. Metanotum always for the most part rugulose.
- (147) 146. Legs testaceous, with the exception of black coxae
70. *octonarius*, Ratz.

(To be continued.)

NOTES AND OBSERVATIONS.

LIBERATION OF NYMPHALIS ANTIOPA IN ENGLAND.—The following letters are published with the consent of the signatories, and will, it is hoped, go far to relieve anxieties concerning future records of *N. antiopa* in these islands :

“ To MESSRS. SAMUEL JONES & Co.

“ *Introduction and Liberation of the Camberwell Beauty Butterfly.*

“ DEAR SIRs,—Owing to the scientific research now being carried out by the Insect Immigration Committee of the South-Eastern Union of Scientific Societies and other scientific societies and

naturalists throughout the British Isles regarding the migration of insects to Britain, it is considered essential to point out that the fauna of every country relating to both the indigenous and migratory species is a subject of too great a scientific importance to be interfered with by the unwise introduction of foreign species, which completely upsets all records of migration and renders all the careful research work useless.

"We should all be greatly obliged if your firm would kindly consent to our request to abstain in future from importing these insects—the Camberwell Beauty—for the purpose of liberating them in this country.

"It may also be pointed out that this butterfly is not indigenous to Britain, and no authentic instance is known of it having bred in a wild state in this country. Its appearance in the British Isles is entirely due to immigration.

"Yours truly,

"F. W. FROHAWK, F.R.E.S.

"We the undersigned are all entirely in agreement with the principle set forth above:

ROTHSCHILD.

JAMES J. WALKER.

KARL JORDAN.

B. M. HOBBY.

N. D. RILEY.

W. RAIT-SMITH.

E. B. POULTON.

H. WILLOUGHBY-ELLIS.

G. D. HALE CARPENTER.

S. G. CASTLE-RUSSELL.

"December, 1935."

"DEAR MR. FROHAWK,—Many thanks for your letter dated December, 1935. I have talked this matter over with our Board, and we have decided that we will not, in future, release Camberwell Beauty Butterflies in this country. If we do decide to give away any chrysalides, we will see that the people who hatch them out do not release them.

"The reason we are agreeing to your request is that we do not think there is any object in our attempting to re-establish this butterfly in England, if, in your opinion, it is not possible; and the small advertisement we get from it does not weigh against the annoyance which is probably caused to scientific societies.

"On the other hand, however, we think you will agree that if it should be proved possible to re-establish this butterfly in this country, then the societies should have no objection to our releasing it, as we think the importance of establishing a very beautiful butterfly in this country far outweighs any Society's records.

"Yours faithfully,

"SAMUEL JONES & Co., LTD.

("NORMAN JONES.)

"21 January, 1936."

Previous references to butterflies set free by Messrs. Samuel Jones & Company will be found in earlier volumes (*Entom.* 64:116; 65:261).—ED.

GONEPTERYX RHAMNI IN NOVEMBER.—With reference to Mr. Frohawk's note on page 14, my friend Mr. H. E. Pounds, in his diary for 1930, records the appearance of *G. rhamni* on the wing as late as November 9th. He tells me that he also saw the insect flying on November 3rd last year, the date recorded. The locality in both instances was Farleigh, Surrey.—WILLIAM E. BUSBRIDGE; "Gresham", Bradbourne Park Road, Sevenoaks.

GONEPTERYX RHAMNI IN NOVEMBER.—I was interested to read Mr. Frohawk's remarks in the January issue of the *Entomologist*, and would like to record that I saw a female on the wing on the same date, November 3rd, 1935, at Byfleet, Surrey.—W. J. FINNIGAN; 6, Shrubland Grove, Worcester Park, Surrey.

GONEPTERYX RHAMNI IN NOVEMBER.—I read with interest Mr. Frohawk's note in the January issue of the *Entomologist* regarding the appearance of a male *G. rhamni* on November 3rd, 1935. The weather on this day was extraordinary, like a typical spring day, and the illusion was heightened by the appearance of numerous butterflies. During the morning I saw quite a number of male *G. rhamni*, also one female of the same species. The day was sufficiently remarkable for several non-entomological friends to comment upon the number of "Brimstones" they had seen. I also noted on the same day *Pieris brassicae* (2), *Aglais urticae* (1), *Polygonia c-album* (1). Perhaps also the following list of first appearances in 1935 may not be without interest:

16.iii.35, *G. rhamni*; 19.iii.35, *A. urticae*; 20.iii.35, *Nymphalis io*; 23.iii.35, *P. c-album*; 15.iv.35, *Pieris rapae*; 22.iv.35, *Pararge aegeria*; 23.iv.35, *Pieris brassicae*, *P. napi*, *Lycaenopsis argiolus*; 4.v.35, *Callophrys rubi*, *Anthocharis cardamines*; 10.v.35, *Polyommatus icarus*; 11.v.35, *Hamearis lucina*; 26.v.35, *Leptidea sinapis*; 16.vi.35, *Maniola jurtina*; 18.vi.35, *Strymon pruni*; 26.vi.35, *Limenitis camilla*; 29.vi.35, *Agapetes galathea*; 30.vi.35, *Vanessa atalanta*; 7.vii.35, *P. c-album* (brood); 14.vii.35, *G. rhamni* (brood); 18.viii.35, *Colias hyale*, *Vanessa cardui*; 24.viii.35, *Colias croceus*.

With the exception of *A. galathea* (Hunts), *C. hyale* and *V. cardui* (Cams.), the whole of the foregoing refer to Northamptonshire. It is interesting to note that after an almost entire absence for three years *L. argiolus* was quite numerous (both broods). Of *N. io*, only odd specimens were seen. *P. c-album* was quite common, also *S. pruni* and *L. camilla*. I saw only three or four *V. cardui* in Northants. *M. jurtina* were absolutely swarming.—CHAS. R. ABBOTT; "Ashleigh", King's Road, Rushden, Northants.

NYMPHALIS ANTIOPA HIBERNATING IN CORNWALL.—Although this record is nine years old it is still worthy of note. I was told the following story by a friend a few days ago when he discovered that I was an entomologist. He himself knows little about the subject, but has at the same time a clear memory of the occasion on which, when wandering in North Cornwall in August, 1927, he observed about half a dozen large butterflies, c ocolate in colour, with cream borders

to the wings, assembled in a small hole in a stone wall from which a stone had been dislodged. He has no doubt about the identity of the insects, as I have since shown him pictures of *Nymphalis antiopa*. The butterflies were in a rather dormant condition. My friend did not realize at the time the value of his discovery, which has thus not been recorded until now. This is certainly an astonishing record, but there is little or no doubt of its truth.—C. I. RUTHERFORD; Little Meadows, Headley, Newbury.

ABNORMAL PAIRINGS.—Mr. E. E. Johnson informs me that the abnormal pairing observed by him (*Entom.*, 68 : 286) was witnessed at Leigh, near Dorking, in Surrey, early in 1935. The publication of this note has brought a long list of similar recorded abnormal pairings from Fleet-Paymaster T. Bainbrigge Fletcher, which is given below, although, as he points out, it makes no pretence to be complete.—ED.

COLEOPTERA.

Chrysomela polita ♂ and *C. "menthrasti"* (? *menthastri*) ♀. *Entom.*, 61 : 234.

Strangalia melanura ♂ and *Leptura livida* ♀. *E. M. M.*, 2 : 70 (1865).

ODONATA.

Aeshna cyanea ♂ and *Ae. juncea* ♀. *Entom.*, 28 : 279 (1895).

LEPIDOPTERA.

Maniola tithonus ♂ and *Pararge megera* ♀. *Ibid.*, 49 : 41 (1916).

Maniola tithonus ♂ and *A. hyperanthus* ♀. *Ibid.*, 41 : 249 (1908).

Maniola jurtina ♂ and *Aglais urticae*. *Ibid.*, 68 : 286 (1935).

Maniola jurtina ♂ and *Aglais urticae* ♀. *E. M. M.*, 6 : 95 (1869).

Maniola jurtina ♂ and *A. hyperanthus* ♀. *Entom.*, 19 : 230 (1886).

Maniola jurtina ♂ and *Aphantopus hyperanthus* ♀. *Ibid.*, 56 : 66 (1923).

Maniola jurtina ♂ and *Argynnis aglaia* ♀. *Ent. Rec.*, 41 : 167 (1929).

Eumenis semele ♀ with two ♂♂ (*semele*). *Entom.*, 33 : 43 (1900).

Argynnis paphia ♂ and *Maniola jurtina* ♂. *Ibid.*, 68 : 286 (1935).

Argynnis paphia ♂ and *Polygonia c-album* ♀. *Ent. Rec.*, 47 : 105 (1935).

Argynnis paphia ♂ and *Thecla quercus* ♀. *Entom.*, 27 : 269 (1894).

Argynnis cydippe and *A. niobe* (sexes not stated). *E. M. M.*, 8 : 166 (1871).

Argynnis daphne ♂ and *Melitaea athalia* ♂. *Entom.*, 44 : 403 (1911).

Aglais urticae ♂ and *Maniola jurtina* ♀. *Ibid.*, 33 : 224 (1900).

Eurytela hiarbas ♂ and *Neptis agatha* ♀. *Ibid.*, 35 : 242 (1902).

Appias libythea ♂ and *Teracolus limbatus* ♀. *Proc. Ent. Soc. Lond.*, 1913, pp. cv-cvi.

Pieris napi ♂ and *Anthocharis cardamines* ♀. *Ent. Rec.*, 38 : 111 (1926).

- Anthocharis cardamines* ♂ and *Bapta temerata* ♀. *Ibid.*, 41 : 167 (1929); *Entom.*, 21 : 188 (1888).
- Smerinthus populi* and *Sphinx ligustri* (sexes not stated). *E. M. M.*, 8 : 183 (1872).
- Attacus cecropia* ♂ and *Sphinx ligustri* ♀. *Entom.*, 19 : 136 (1886).
- Saturnia pavonia* (-minor) ♂ and *Cerura vinula* ♀, attempted copulation. *Ent. Rec.*, 8 : 85 (1896).
- Endromis versicolor* ♂ and *Amphidasys strataria* ♀. *Entom.*, 48 : 264 (1915).
- Endromis versicolor* ♂ and *Biston* (*strataria* =) *prodromaria* ♀. *Ibid.*, 47 : 38 (1914).
- Stilpnotia salicis* ♂ in cop. successively with 4 ♀♀, all ova fertile. *Ent. Rec.*, 3 : 255 (1892).
- Lasiocampa quercus*, 2 ♂♂ in cop. *Ibid.*, 5 : 198.
- Spilosoma fuliginosa* ♂ and *Arctia caja* ♀. *Entom.*, 30 : 247 (1897).
- Noctua c-nigrum* and *N. xanthographa*. *Ibid.*, 31 : 279 (1898).
- Noctua xanthographa* ♂ and *Cerapteryx graminis* ♀. *Ibid.*, 46 : 314 (1913).
- Noctua xanthographa* ♂ and *Palluperina testacea* ♀. *Ibid.*, 43 : 43 (1910).
- Noctua xanthographa* ♂ and *Cerapteryx graminis* ♀. *Ent. Rec.*, 2 : 201 (1891).
- Nonagria brevilinea* ♂ and *Leucania impura* ♀. *Entom.*, 44 : 34 (1911).
- Xylophasia monoglypha* (♂) and *Hadena trifolii* ♀. *Ibid.*, 21 : 282 (1888).
- Monima stabilis* ♂ and *M. gothica* ♀ (two occasions). *Ibid.*, 21 : 188 (1888).
- Monima stabilis* ♂ and *M. munda* ♀. *Ent. Rec.*, 8 : 36 (1896).
- Monima stabilis* ♂ and *M. gothica* ♂. *Entom.*, 29 : 166 (1896).
- Conistra vaccinii* ♂ and *Meganephria oxyacanthae* ♀. *Ibid.*, 21 : 188 (1888).
- Erannis marginaria* ♂ and *Selenia bilunaria* ♀. *Ent. Rec.*, 41 : 167 (1929).
- Erannis marginaria* ♂ and *Monima pulverulenta* ♀. *Entom.*, 29 : 166 (1896).
- Hibernia marginaria* ♂ and *Nyssia hispidaria* ♀. *Ent. Rec.*, 4 : 156.
- Acidalia interjectaria* ♂ and *A. virgularia* ♀. *Ibid.*, 67 : 15 (1934).
- Argyresthia ephippella* and *A. mendica* in cop. Fuchs, *Stett. Ent. Ztg.*, 64 : 243 (1903).
- Zygaenid* and *Malacosoma neustria*. *Entom.*, 48 : 244 (1915).

NOTES FROM THE HEBRIDES.—Owing to the demands of certain research work, I was compelled to spend the bulk of October and November, when the terrible gales then prevalent were at their height, on some of the islands in the Inner and Outer Hebrides. Although my interests lay chiefly with other groups, I naturally collected any lepidopterous larvae which came my way. These were

limited in the number of species represented, but still one rarity fell into my beating-tray on Barra, and that was *Gnophos myrtillata*. Of that species I obtained three specimens from heather. At the same time *Erica cinerea* and *Calluna vulgaris* yielded an abundance of larvae of *Boarmia repandata*, *Abraxas grossulariata*, *Agrotis strigula* and *Triphaena comes*. On Canna, heather also produced *A. grossulariata*, and it is noteworthy that, both on this island and on Barra, the larvae were still active in mid-November. Spruces on the same island also provided food for a colony of *Thera variata*. From Ulex on Tiree odd examples of *Triphaena pronuba* were obtained, whilst I procured an abundance of *Gonodontis bidentata* and *Amphidasys betularia* from birches on Mull; on the latter island imagines of *Depressaria heracliiana* occurred.

It is worthy of mention, too, that during my examination of stems of *Salix aurita* on Mull, Barra, Canna, Raasay and Scalpay, I detected enormous quantities of the Coccid *Chionaspis salicis*. These were a little larger and broader than examples of the same species occurring in Northumberland and Durham, but, nevertheless, could only be referred to that species. *Orthezia cataphracta*, likewise, was sifted from moss on Barra.—(Dr.) GEORGE HESLOP HARRISON; Armstrong College, University of Durham, Newcastle upon Tyne.

RECENT LITERATURE.

British Museum (Natural History).

The past few months have witnessed the completion of the *Insects of Samoa*, publication of which, under the general editorship of Prof. Buxton, was commenced in 1927. On June 5th, 1935, the Summary was issued, and this was followed by the Index (December 20th, 1935) and a set of title-pages. Prof. Buxton concludes that the fauna of Samoa is clearly Indo-Malayan, but contains a few links, definite and consequently very interesting, with Australia, such as *Rutilia*, *Dichelopa*, *Phlegetonia*, etc. The existence of an American element in the fauna is strongly discounted. With regard to the question as to "how they got there", the suggestion is made that, besides man and the floating log, the upper air currents, which are known to be favourable to colonization from the west, have probably played an important part. It is a matter of congratulation to all concerned that this considerable publication should have been completed within ten years of the arrival in England of the collections upon which it was mainly based.

More recently the Trustees have also issued a revised edition of the *Clothes Moth* pamphlet (No. 14), and a booklet dealing with *Immigrant Butterflies and Moths*. The former has been modified chiefly by the elimination of matter that had no very direct bearing upon the immediate purpose of the pamphlet, and improved by simplification here and there in the treatment of its subject. The other brochure has been issued largely with the object of assisting

the work of the Committee dealing with migration records. It contains five plates in colour, illustrating all the more important species concerned, and eight pages of letterpress by Dr. C. B. Williams.

Transactions of the Suffolk Naturalists' Society. Vol. III, pt. 1.

The most solid entomological matter in this volume is the gay editor's list of the Hymenoptera of Suffolk, part 1, or rather "*portio prima*". This deals with the Sawflies, Aculeates, Cynipidae and Proctotrypidae. It runs to 36 pages, and must be as good a county list as any that has yet appeared of this very unequally worked Order. Another article is by Dr. Blair on coleopterous remains in peat thrown up on the coast at Caister, the interest being chiefly in the occurrence of *Rhysodes*, a genus no longer occurring in Great Britain, unlike the others recorded. There is also an account by T. N. Waller of the history of his Suffolk *Argynnis niobe*, and a few other notes of entomological interest. The editor ensures that both Transactions and Proceedings are never dull, and also that membership of the Society shall steadily increase.

United States Department of Agriculture.

The following publications have been received since those last noted in these pages (68 : 290):

Technical Bulletin No. 487.

Boll Weevil control with calcium arsenate . . . in Louisiana, 1920-1934. The tests were designed to correlate winter temperature, degree of infestation and rainfall with the effectiveness of the calcium arsenate treatments, and led to results of some value in the use of this form of control.

Circulars.

No. 365 : The Camphor Scale. The history of *Aspidiotus duplex* in the United States is traced since its discovery there in 1920, and an account of its biology is followed by a summary of methods of control.

No. 373 : Fumigation of Fresh Fruit to destroy the Japanese beetle. The tests described arose from the necessity of applying quarantine methods, and a series of carefully controlled experiments with carbon disulphide, ethylene oxide and HCN is described.

Farmers' Bulletin No. 1548.

The European Corn Borer: Its present status and methods of control. Its title sufficiently explains this revised edition of the bulletin first issued in 1927.

SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON.—*Wednesday, November 20th, 1935.*—Sir Edward Poulton, F.R.S., Hon. Life President, in the Chair.—*Election of Fellows.*—The following were

elected Fellows of the Society: George A. Bisset, Department of Entomology, British Museum (Natural History), Cromwell Road, S.W. 7; E. B. Britton, 99, Cornwall Road, Westbourne Park, W. 11; K. H. Chapman, The Knowle, Knowles Hill, Newton Abbot, S. Devon; Miss Theresa Clay, B.Sc., 18, Kensington Park Gardens, W. 11; Ernest P. Hodgkin, Riverdene, Broxbourne, Herts, and The Institute for Medical Research, Kuala Lumpur, Federated Malay States. *Nominations*.—The Secretary read the following list of Fellows nominated by the Council as Officers and Council for the ensuing year: *President*, A. D. Inms, Sc.D., M.A., F.R.S.; *Treasurer*, Francis Hemming, C.B.E.; *Secretary*, A. W. McKenny-Hughes, D.I.C. For other members of Council: R. B. Benson, M.A., Prof. P. A. Buxton, M.A., Prof. G. D. Hale Carpenter, M.B.E., D.M., C. L. Collenette, Brig.-Gen. B. H. Cooke, C.M.G., C.B.E., D.S.O., H. Willoughby-Ellis, H. Eltringham, M.A., D.Sc., F.R.S., G. Fox-Wilson, L. G. Higgins, M.A., F.R.C.S., S. A. Neave, O.B.E., M.A., D.Sc., J. A. Simes, O.B.E., W. H. T. Tams, W. H. Thorpe, M.A., Ph.D., C. B. Williams, M.A., Sc.D. *Exhibits*.—Sir Edward Poulton, F.R.S., exhibited and discussed the offspring of a pair of *Hyloicus pinastri* L., taken near Wareham, Dorset, in 1934, by Mr. H. L. Andrewes. He also described (a) (on behalf of Dr. Botha de Meillon) a Fossorial Wasp's attempts to find its mud nest after a change in position, or the removal of an adjacent conspicuous object, Tzaneen, North Transvaal; and (b) (on behalf of Mr. R. Carrick) experiments to test the efficiency of protective adaptations in insects, illustrated by lantern-slides. Mr. W. N. Scott (a visitor) discussed the diurnal rhythm of emergence from the pupa. Prof. G. D. Hale Carpenter exhibited and discussed (1) a note by Major S. S. Flower on evidence of preferential feeding among birds, and (2) a large silk "nest" from Brazil. Dr. F. W. Edwards exhibited and discussed (1) living specimens of *Chionea lutescens* Lunst., a wingless Tipulid sent by Mr. J. P. Kryger from Denmark, and (2), Blepharoceridae from the Pyrenees. Dr. K. G. Blair exhibited some elm leaves with symmetrical punctures on either side of the midrib. *Papers*.—The following papers were read: Feeding Habits of Adult Lepidoptera Heteroneura, by M. J. Norris (Mrs. O. W. Richards); Uganda Simuliidae, by E. G. Gibbins; Descriptions of three New Species of *Drepanosticta* (Odon), from Philippine Islands, by J. Cowley; New Mealybugs from East Africa, by H. C. James; A Revision of the Triplectidinae (Leptoceridae Trichoptera), by M. E. Mosely; The Relation of Humidity and Temperature to the Development of Three Species of African Locusts, by A. G. Hamilton; Hymenoptera of the New Hebrides and Banks Island, by Miss L. E. Cheesman; The Study and Ecology of Tsetse Flies in East Africa, by C. F. M. Swynnerton; The Contents of the Parts and Date of Publication of Seitz's *Grossschmetterlinge der Erde*, by Francis J. Griffin.

Wednesday, December 4th, 1935.—Dr. S. A. Neave, O.B.E., President, in the Chair.—The Secretary read for the second time

the nominations of the Council for Officers and Council for 1936. *Election of Fellows*.—The following was elected a Fellow of the Society: Kenneth Smith, A.L.A., 15, Clarence Drive, Horsforth, near Leeds. *Obituary*.—The death of Mr. W. G. Bainbridge, elected a Fellow of the Society in 1933, was announced. *Announcement*.—The President made an announcement regarding the reorganization of the Society's publications. *Exhibits*.—Major H. C. Gunton discussed some phenological records for 1935, illustrating his remarks with lantern-slides. Dr. F. W. Edwards gave a lecture, illustrated by lantern-slides, on an ascent of Mount Elgon made during the British Museum Expedition to East Africa, 1934-35. *Paper*.—The following paper was read: Odonata Collected in Japan, with Descriptions of Three New Species, by F. C. Fraser.—A. W. McKENNY HUGHES (*Hon. Sec.*).

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club was held at The Museum, Tring Park, on November 16th, 1935, Lord Rothschild in the Chair. Members present: Lord Rothschild, Sir Edward B. Poulton, Mr. Horace Donisthorpe, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin, Mr. W. J. Kaye, Mr. R. W. Lloyd. Visitors present: Mr. Gilbert J. Arrow, Major E. E. Austen, Dr. K. G. Blair, Mr. E. C. Bedwell, Dr. W. T. Calman, Mr. C. N. Collenette, Dr. E. A. Cockayne, Mr. Guy Dollman, Mr. J. C. F. Fryer, Mr. H. M. Edelsten, Major S. S. Flower, Mr. F. W. Frohawk, Prof. G. D. Hale Carpenter, Capt. F. Hemming, Major R. W. G. Hingston, Mr. H. R. Hewer, Dr. A. D. Imms, Dr. Karl Jordan, Mr. W. H. Laing, Mr. John Levick, Dr. Percy R. Lowe, Sir Guy A. K. Marshall, Dr. S. A. Neave, Mr. Wm. E. F. Nelson, Mr. Chas. Oldham, Mr. Louis B. Prout, Capt. N. D. Riley, Mr. W. Rait Smith, Mr. H. Stevens, Dr. C. Davies Sherborn, Mr. W. H. T. Tams, Mr. Hy. J. Turner, Dr. V. B. Wigglesworth, Comdr. J. J. Walker, Mr. C. J. Wainwright, Mr. C. G. M. de Worms. The members and visitors were received by Lord Rothschild at the Museum in the morning and the collections were open for inspection. The Chairman specially exhibited the following: 85 drawers of the genus *Colias* and 3 drawers of the two British *Colias*; 19 drawers of palaearctic *Cossidae* and 12 drawers of the *Cuculiine* genera *Metapoceros*, *Cleophana* and *Calophasis*; 1 drawer of Continental aberrations and 3 of British aberrations of *Arctia caja*, to show that with the exception of the aberration *peterburgensis*, which is purely British, the aberrations of the garden Tiger are similar throughout its range. Particularly interesting among the exhibits were, in the *Colias* a series of 18, bred from a single ♀ of *Colias erate* ab. *chrysodona*, which go far to prove *chrysodona* to be a hybrid; the gynandromorphs of *Colias lesbia* and the 2 ♀♀ *Colias croceus* part normal ♀ and part ♀ form *helice*, the unique series of aberrations of *Arctia caja*, the new white *Cossus* from Persia, the long series of *Zeuzera nubila* and *Dyspessa vaulogerii*, the natural hybrids between *Cleophana diluta* × *Cleophana warreni* and between *Papilio sesostris* × *Papilio orilus*, the gynandromorph

Morpho eugenia uraneis, the melanistic *Argynnis aglaia* and *Argynnis childrenae*, the melanistic *Sphinx ligustri* from Germany and Hemel Hempstead, and lastly the long series of the very rare *Colias chlorocomma*. Luncheon was served at one o'clock, and the large party on this occasion had to be accommodated in two rooms. After luncheon Mr. Donisthorpe showed a queen and two workers of the ant *Stenamma Westwoodi*, West. The queen had been alive in his observation nest for 14 years, *i. e.* from September 20th, 1921, on which date it was sent to him by Messrs. Phillips & Stelfox, to October 2nd, 1935, when she died. He estimated that this ant was probably 18 years old, and certainly 16 years old, and said that it was the oldest imaginal insect on record. The next oldest adult was recorded by Sir John Lubbock (Lord Avery) in 1888, *i. e.* a queen of *Formica fusca*, which he stated must have been nearly 15 years old, and at that time was the oldest adult insect on record. Moreover, the author goes on to say, what is very extraordinary, she continued to lay fertile eggs—a most interesting fact from a physiological point of view. Fertilization took place in 1874 at the latest. There has been no male in the nest since then, and moreover he believed that it was well established that queen ants and queen bees are fertilized once for all; hence the spermatozoa of 1874 must have retained their life and energy for 13 years—a fact he believed unparalleled in physiology. Other instances of longevity in insects known to the speaker were: Janet kept a queen of *alienus* Först. alive for 10 years, also specimens of *Claviger testaceus* Preys. for over 4 years in his nests. The meeting was very successful and entertaining, and a most happy and instructive day was spent.

A Meeting of the Entomological Club was held at 332, Great West Road, Heston, Middlesex, at 7.30 p.m. on December 11th, 1935, Mr. Horace Donisthorpe in the Chair. Members present in addition to the Chairman: Mr. Jas. E. Collin, Mr. R. W. Lloyd. Visitors present: Rev. E. B. Ashby, Mr. R. B. Benson, Mr. de A. Donisthorpe, Dr. Karl Jordan, Mr. J. F. Perkins, Mr. W. Rait-Smith, Capt. N. D. Riley. A very pleasant and entertaining evening was spent.—H. WILLOUGHBY-ELLIS (*Hon. Sec.*).

BIRMINGHAM NATURAL HISTORY AND PHILOSOPHICAL SOCIETY: ENTOMOLOGICAL SECTION.—November 18th.—Prof. Beckwith Whitehouse, M.S., F.R.C.S., President, in the Chair.—Mr. J. H. Grant, F.R.E.S., was elected President of the Section for the coming year, and a vote of thanks was passed in recognition of his ten years' office as Hon. Secretary; Mr. Stewart Carlier, F.R.E.S., was elected Hon. Secretary. There were 18 members and friends present to hear the interesting talk given by Mr. Grant on the natural colour photographs shown by Mr. H. Potter, F.R.M.S., under the title of Exotic Insects and Colour. The colour photographs were of the highest quality, and were very remarkable reproductions of a large number of rare and brilliant Lepidoptera.—P. SIVITER SMITH (*Hon. Corresponding Sec.*).

THE ENTOMOLOGIST.

VOL. LXIX.]

APRIL, 1936.

[No. 875]

AN ATTEMPT TO BREED FROM *LYSANDRA CORIDON* PODA, VAR. *SYNGRAPHA* KEFF.

BY S. G. CASTLE RUSSELL, F.R.E.S.

THIS beautiful form of the female has been of great interest to me ever since I captured my first example in company with my old friend, the late Rev. C. A. Sladen, who first took in in 1870, recorded it in vol. xxix of the *Entomologist*, 1880, and gave a full description in the *Entomologist*, vol. xxxv, 1902. So far as I am able to trace, no successful attempt has been made to breed from the form, although examples are occasionally taken in copula. Having caught two rather worn females on August 22nd, 1934, I determined to make an effort to ascertain the following points:

(1) Are fertile eggs deposited?

(2) If so, are the resultant imagines var. *syngrapha*, typical *coridon*, or both?

I confined the butterflies on a growing plant of *Hippocrepis comosa*, and after a week released them. Examination showed that some thirty eggs had been laid on the stalks of the food-plant or on adjacent stems of grass. These I removed and placed in a glass-topped metal box for the winter.

Early in March, 1935, I placed the eggs on a growing plant of *comosa* which had been forced to produce shoots for the larvae to feed on as they hatched. At the beginning of April I was able to see several very tiny larvae, and on May 1st I counted about twenty, all very small, but varying in size. Early in June I found the number reduced to twelve, varying in size from a quarter to half fed. One, however, was quite full fed, and this rapid growth puzzled me, until it pupated and produced a fine male *Lysandra bellargus*, evidently from an egg laid on the plant I had dug up from the Down. At this stage, when the larvae were of a fair size, I introduced a few ants (*Formica rufa*), and such larvae as were from time to time visible were invariably attended by these ants, which were apparently sucking the honey-glands.

About the second week in June four of the larvae seemed to be full fed and wandering about the cage with a view to pupating. Eventually two pupated on the ground. These I just covered with earth, knowing that in nature the larvae burrow or hide themselves in the roots of the food-plant. The other two burrowed in the earth, just covering themselves. A description

of the egg and larva is unnecessary, as Mr. F. W. Frohawk has faithfully described them in his book on *British Butterflies*.

On August 3rd a male emerged, badly crippled in one fore wing. The upperside was quite typical, but the colouring of the underside was slaty-grey and much darker than normal. No more emergences occurred, and on investigation I found that the pupae that I had covered up had had their interiors eaten out by some insect—they were at any rate perfectly empty. The other two that had burrowed had died without pupating. I found the empty pupa-case of the male that had emerged, but no other pupae or dead larvae.

It will be seen that the experiment was not entirely unsuccessful, as it established the fact that the var. *syngrapha* lays fertile eggs. I intend to continue the experiment, as I captured an example in copulation in August last and have obtained a small number of eggs. On this occasion I propose to omit the introduction of ants, as I am not convinced that these are necessary for the well-being of the larvae: those I reared did very well without them until they were fully half grown.

With regard to the occurrence of this form of the female *L. coridon* I have noted a curious thing, viz., that its appearance in any numbers seems to presage the end of the particular colony so far as abundance is concerned. I have personally noted some six or seven instances where this considerable falling-off in numbers has occurred, and in each case the insect is now scarce, and *syngrapha* conspicuous by its absence. It may be that its appearance is a sign of degeneracy or disease. At the same time, however, I have found that other very abundant colonies, where *syngrapha* occurred very rarely, have, in recent years, dwindled to very small numbers. This I think must be due to the increased numbers of the species of ichneumon that prey on the larvae. I do not think that climatic influence has anything to do with the scarcity, as in two localities only four miles apart in Hampshire, where I found abundant colonies, in one the abundance has continued, whilst in the other the insect has almost disappeared. A similar thing occurred with regard to two colonies I know of in Buckinghamshire. So far as my own experience goes *Lysandra coridon* is not nearly so generally abundant as it used to be, especially in Hants and Wilts, although in some localities large and abundant colonies still exist.

Var. *syngrapha* varies only to a small extent, the variation being chiefly in the width of the marginal borders on the wings and the prominence or otherwise of the red spots on the borders. The colour varies from light blue, as exemplified in the race from the Chiltern Hills, to the slightly darker blue shown in the Wiltshire race. Occasionally, but very rarely, the blue is replaced by, a distinct green.

In my collection are the following forms :

(1) ab. *excelsa* : A form in which the red spots on the margins of the wings are replaced by black spots. It is very rare ; in one of my examples the spots are abnormally large and wedge-shaped.

(2) ab. *discoidalis nulla* : A form in which the usual discal spots in the fore wings are absent.

(3) ab. *discoidalis quadra* : A form with discal spots on all four wings.

(4) A form in which the left wings are typical *syngrapha* ; the right wings are also *syngrapha*, but the upper one is clouded and peppered with brown, with large orange-red spots on the border ; the lower wing has several streaks of brown.

(5) An example in which both left wings are of typical brown colouring, but the wings on the right side are *syngrapha* with the exception of several brown streaks in the fore wing.

(6) A form in which the wings on the left side are of typical brown. On the right side there is a large patch of *syngrapha* blue covering more than two-thirds of the wing ; the lower wing is typical brown.

(7) Two examples in which all four wings are brown, but have on the left fore wing a wide streak of *syngrapha* blue, which covers the top portion of the wing.

(8) An underside of *cinnus obsoleta* form.

(9) An underside with the ground-colour of the upper wings white instead of the usual brown, and the colour of the hind wings brown, heavily splashed with white.

In the majority of cases the underside of *syngrapha* is quite distinct from the typical form. There is a long white wedge, which is so apparent that specimens at rest can easily be discriminated from typical females.

In Hertfordshire a blue form of the female occurs that has been named *semisyngrapha* ; this, although sometimes closely approaching *syngrapha*, is, in my opinion, totally distinct from it. In this locality *semisyngrapha* sometimes appears in comparatively large numbers, but I have never seen a true form of *syngrapha* there, although extreme forms of ab. *inequalis* Tutt very closely approach it. In those localities where *syngrapha* appeared very plentifully some years ago forms of *semisyngrapha* were very rare, and very seldom as extreme as the Herts form. In some seasons blue-marked forms of the female are plentiful in many districts, but very rarely of the Herts *semisyngrapha* form. Dr. E. A. Cockayne, whose remarkable and able papers on gynandromorphism in *L. coridon* are so well known, informs me that the ab. *syngrapha* shows no male characters. The blue scales vary ; some are serrated like those of *semisyngrapha* or of females with a few blue scales on the

wings, while others have a smooth edge and in shape resemble those of males, although their colour is different. There are no androconia and no long hairs on the basal parts of the wings, both of which are present in males. The genitalia are like those of ordinary females. The same remarks apply to ab. *inaequalis*; two or three examples taken in Hertfordshire by C. P. Pickett are normal females on one side, but on the other side are as blue as *syngrapha* and have a deep blue-black border. These also have no male characters, and should be regarded as extreme *inequalis* rather than somatic mosaics with one side normal and the other side *syngrapha*. There is no proof that these forms are intersexes, and there is definite proof that they are not gynandromorphs.

MACROLEPIDOPTERA OF IRELAND.—The following are some additional records to Lieut.-Col. Donovan's recently published *Catalogue of the Macrolepidoptera of Ireland*. Two species in particular are important, *Cerastis ligula* and *Pericallia syringaria*. *Callophrys rubi* is common at the Quill, a small wood near Kilmacanogue, co. Wicklow, *Zephyrus quercus*, the Quill and the Glen o' the Downs, co. Wicklow, and *Cyaniris argiolus*, the Quill and near Carrickmines, co. Dublin. *Sesia tipuliformis* is common at Seapoint, co. Dublin. *Hepialus lupulinus* is abundant at the Glen o' the Downs, and I have also taken it at Kilruddery, co. Wicklow, and at Seapoint. *Lithosia lurideola* and *Cilix glaucata* come to light frequently and often commonly at Seapoint. *Nola confusalis* occurs sparingly at the same locality. I have bred several *Diloba caeruleocephala* from larvae taken on hawthorn at Powerscourt, co. Wicklow. With regard to *Cerastis ligula*, I captured one specimen of this rare Irish species at ivy bloom at a locality in Glenageary, near Killiney, co. Dublin, on October 8th, 1933, and a second on October 22nd, 1933, the only two nights I visited that locality. Both specimens were ab. *spadicea*. The occurrence of this rare species so near Dublin is of note. It has not previously been definitely recorded from Dublin or Wicklow. *Chariclea umbra*, Seapoint, one, July 6th, 1934. *Amphipyra pyramidea* is fairly common near the town of Wexford, *Sarothripus revayanus*, the Glen o' the Downs, co. Wicklow, and *Plusia festucae*, near Wexford. *Hemithea aestivaria*, common, Seapoint, co. Dublin, and near Wexford. *Phibalapteryx vittata*, Curraclose, co. Wexford, September 4th, 1935. *Pericallia syringaria*: I captured a fine specimen of this rare species at Park, near the town of Wexford, on July 6th, 1935. This species is very rare in Ireland, but has been recorded from counties Galway, Kildare, Waterford, Kerry and Cork. *Venilia macularia*, Glen o' the Downs, co. Wicklow. *Halia waiwaria*, very common at Seapoint and Rathgar, co. Dublin, and near Wexford. The majority of the above records are for last year, 1935.—BRYAN BEIRNE; 4, Tobernea Terrace, Monkstown, co. Dublin.

A LIST OF LEPIDOPTERA FROM WHICH PARASITES
ARE PARTICULARLY DESIRED.

BY D. S. WILKINSON, F.R.E.S.

In the course of preparing a monograph of the palaearctic species of the Braconid genus *Apanteles*, I have been very greatly helped by many kind friends, who have supplied me with carefully-bred *Apanteles* material, from known hosts, and some have even gone so far as to suggest that I provide them with a list of desiderata. It is to meet this need that the following list has been prepared; and I hope that its length, far from proving the deterrent which at first sight might seem probable, will, in fact, act as a stimulant. So many of the descriptions of *Apanteles* published by the earlier authors are devoid of reference to those characters to which nowadays great importance is attached, that recognition of these species depends to a very large extent upon the examination of material known to have been bred from the same host larvae as the original material. It will be appreciated, therefore, how desirable it is to obtain for comparison *Apanteles* bred from the hosts enumerated below. The hosts include the majority of species from which *Apanteles* have been bred; but I should add that, although these are the species in which I am particularly interested, I shall be very glad indeed to receive material from other hosts not enumerated.

As regards treatment of specimens, *Apanteles*, and for that matter all Braconids of about the same size as *Apanteles*, but particularly *Apanteles* and its closely-related genera, such as *Microgaster* and *Microplitis*, should on no account be preserved in spirit, however weak; this treatment ruins them for taxonomic purposes. The insects should be allowed to die, and should then be put into a pill-box, or some such small container, together with some cotton-wool to keep them in place. They travel through the post like this very well indeed.

A star indicates that this species of *Apanteles* is particularly desired from this host; a double star, that it is very particularly desired.

RHOPALOCERA.

Host.	LYCAENIDAE.	Parasite.
<i>Aricia agestis</i> , Schiff. (<i>Lycaena astrarche</i> , Bergs.)		<i>Apanteles astrarches</i> , Marsh.
* <i>Lycaena phlaeas</i> , L.		<i>A. cupreus</i> , Lyle.
<i>Polyommatus icarus</i> , Rott.		<i>A. zygaenarum</i> , Marsh.

NYMPHALIDAE.

** <i>Vanessa</i> (all species)	<i>A. vanessae</i> , Reinh.
---	-----------------------------

HETEROCERA.

AGROTIDAE.

* <i>Cucullia scrophulariae</i> , Cap.	. . .	<i>A. scrophulariae</i> , Szép.
* <i>Diloba caeruleocephala</i> , L.	. . .	<i>A. insidens</i> , Ratz.
** <i>Melancha persicariae</i> , L.	. . .	<i>A. femoralis</i> , Bé.
<i>Miselia oxyacanthae</i> , L.	. . .	<i>A. insidens</i> (Ratz.), Lyle.

ARCTIIDAE.

<i>Phragmatobia fuliginosa</i> , L. (<i>Spilosoma</i>)	<i>A. vitripennis</i> , Curt.
<i>Tyria jacobaeae</i> , L.	<i>A. popularis</i> , Hal.

GEOMETRIDAE.

<i>Cabera pusaria</i> , L.	<i>A. caberae</i> , Marsh.
* <i>C. pusaria</i> , L.	<i>A. jugosus</i> , Lyle.
** <i>Chloroclysta siterata</i> , Hufn. (<i>Geometra</i> <i>psittacata</i> , Hüb.)	<i>A. scapularis</i> , Bé.
<i>Cleora lichenaria</i> , Leech	<i>A. vitripennis</i> , Curt.
* <i>Cosymbia annulata</i> , Sch. (<i>Ephyra</i>)	<i>A. juniperatae</i> (Bé), Lyle
* <i>C. pendularia</i> , Clerk	<i>A. juniperatae</i> (Bé), Lyle
* <i>C. punctaria</i> , L.	<i>A. juniperatae</i> (Bé), Lyle
<i>Enconista miniosaria</i> , Dup.	<i>A. impavidus</i> , G. & D.
<i>Erannis defoliaria</i> , Clerk	<i>A. hiberniae</i> , Kurd.
* <i>E. defoliaria</i> , Clerk	<i>A. juniperatae</i> (Bé.), Lyle.
* <i>Eupithecia abbreviata</i> , Steph.	<i>A. juniperatae</i> (Bé.), Lyle.
<i>E. assimilata</i> , Doubl.	<i>A. lateralis</i> , Hal.
<i>E. expallidata</i> , Doubl.	<i>A. praepotens</i> (Hal.), Lyle
<i>E. nanata</i> , Hüb.	<i>A. praepotens</i> (Hal.), Lyle
<i>Hemithea aestivaria</i> , Hüb.	<i>A. parallelus</i> , Lyle.
<i>Hybernia defoliaria</i> , Clerk	<i>A. salebrosus</i> , Marsh.
<i>Iodis lactearia</i> , L.	<i>A. caberae</i> , Marsh.
<i>Lomaspilus marginata</i> , L.	<i>A. caberae</i> , Marsh.
** <i>Operophtera brumata</i> , L. (<i>Cheimatobia</i>)	<i>A. ater</i> , Ratz.
<i>Oporinia dilutata</i> , Schiff.	<i>A. salebrosus</i> , Marsh.
<i>Selenia bilunaria</i> , Esp.	<i>A. caberae</i> , Marsh.
** <i>Thera juniperata</i> , L.	<i>A. juniperatae</i> , Bé.
<i>T. obeliscata</i> , Hüb.	<i>A. pinicola</i> , Lyle.
<i>T. variata</i> , Schiff.	<i>A. pinicola</i> , Lyle.

LASIOCAMPIDAE.

<i>Gastropacha quercifolia</i> , L.	. . .	<i>A. gastropachae</i> (Bé), Lyle.
** <i>Malacosoma neustria</i> , L.	. . .	<i>A. gastropachae</i> , Bé.
<i>Poecilocampa populi</i> , L.	. . .	<i>A. insidens</i> (Ratz.), Lyle.

LYMANTRIIDAE.

* <i>Leucoma salicis</i> , L. (<i>Stilpnotia</i>)	. . .	<i>A. melanoscelus</i> , Ratz.
<i>Lymantria dispar</i> , L.	. . .	<i>A. liparidis</i> , Bé.
<i>L. dispar</i> , L.	. . .	<i>A. ochneriae</i> , Ivan.
<i>L. dispar</i> , L.	. . .	<i>A. vitripennis</i> , Curt.

NOTODONTIDÆ.

<i>Cerura vinula</i> , L.	.	.	.	<i>A. affinis</i> , Nees.
<i>Drymonia ruficornis</i> , Hufn.	.	.	.	<i>A. complanatus</i> , Lyle.
<i>Lophopteryx camelina</i> , L.	.	.	.	<i>A. abjectus</i> , Marsh.
<i>Notodonta dromedarius</i> , L.	.	.	.	<i>A. abjectus</i> , Marsh.
<i>N. ziczac</i> , L.	.	.	.	<i>A. abjectus</i> , Marsh.
<i>Pheosia gnoma</i> , F. (<i>dictaeoides</i> , Esp.)	.	.	.	<i>A. abjectus</i> , Marsh.
<i>P. gnoma</i> , F. (<i>dictaeoides</i> , Esp.)	.	.	.	<i>A. complanatus</i> , Lyle.

PYRALIDÆ.

<i>Acrobasis consociella</i> , Hübn.	.	.	.	<i>A. longicauda</i> , Wesm.
<i>Dioryctria abietella</i> , Schiff.	.	.	.	<i>A. lacteus</i> , Nees.
* <i>D. abietella</i> , Schiff.	.	.	.	<i>A. nigripes</i> , Ratz.
<i>Homoeosoma nebulella</i> , Schiff.	.	.	.	<i>A. lacteus</i> , Nees.
<i>Pionea forficalis</i> , L.	.	.	.	<i>A. gabrielis</i> , G. & R.
<i>P. crocealis</i> , Hübn.	.	.	.	<i>A. obscurus</i> , Nees.
<i>P. forficalis</i> , L.	.	.	.	<i>A. picipes</i> , Bé.

SPHINGIDÆ.

<i>Celerio euphorbiae</i> , L.	.	.	.	<i>A. euphorbiae</i> , Bé.
** <i>Macroglossum stellatarum</i> , L.	.	.	.	<i>A. stellatarum</i> , Bé.

ZYGAENIDÆ.

<i>Zygaena filipendulae</i> , L.	.	.	.	<i>A. zygaenarum</i> , Marsh.
----------------------------------	---	---	---	-------------------------------

MICROLEPIDOPTERA.

TINEIDÆ.

* <i>Acrolepia pygmaeana</i> , Haw.	.	.	.	<i>A. ensiformis</i> , Ratz.
* <i>Anacampsis populella</i> , Clerk	.	.	.	<i>A. hoplites</i> , Ratz.
<i>Aristotelia inopella</i> , Zell.	.	.	.	<i>A. halidaii</i> , Marsh.
* <i>Bucculatrix nigricomella</i> , Zell.	(on	<i>Chrysanthemum leucanthemum</i>)	.	<i>A. carbonarius</i> , Wesm.
<i>Butalis fuscoaenea</i> , Haw.	.	.	.	<i>A. butalidis</i> , Marsh.
<i>Coleophora ardeipenella</i> , Scott	.	.	.	<i>A. ardeaeppenellae</i> , Bé.
* <i>C. fuscadinella</i> , Zell.	.	.	.	<i>A. corvinus</i> , Reinh.
<i>C. fuscadinella</i> , Zell.	.	.	.	<i>A. mesozanthus</i> , Ruschka.
<i>C. limoniella</i> , Staint.	.	.	.	<i>A. halidaii</i> , Marsh.
<i>C. salinella</i> , Staint.	.	.	.	<i>A. ononidis</i> , Marsh.
<i>Depressaria nervosa</i> , Haw.	.	.	.	<i>A. emarginatus</i> , Nees.
<i>Elachista taeniatella</i> , Staint.	.	.	.	<i>A. lateralis</i> , Hal.
<i>Goniodoma limoniella</i> , Staint.	.	.	.	<i>A. halidaii</i> , Marsh.
<i>Gracilaria semifascia</i> , Haw.	.	.	.	<i>A. laetus</i> , Marsh.
<i>G. syringella</i> , F.	.	.	.	<i>A. dilectus</i> , Hal.
** <i>G. syringella</i> , F.	.	.	.	<i>A. ardeaeppenellae</i> , Bé.
** <i>Hyponomeuta evonymella</i> , L.	.	.	.	<i>A. evonymella</i> , Bé.
<i>Hyponomeuta padella</i> , L.	.	.	.	<i>A. lateralis</i> , Hal.
** <i>Lithocolletis amyotella</i> , Dup.	.	.	.	<i>A. nanus</i> , Reinh.
<i>L. blancardella</i> , F.	.	.	.	<i>A. blancardellae</i> , Bé.
* <i>L. blancardella</i> , F.	.	.	.	<i>A. flavolimbatus</i> , Ratz.
* <i>L. populifoliella</i> , Tr.	.	.	.	<i>A. flavolimbatus</i> , Ratz.

<i>Nothris senticetella</i> , Stgr.	<i>A. impavidus</i> , G. & D.
* <i>Parectopa ononidis</i> , Zell.	<i>A. ononidis</i> , Marsh.
** <i>Scythris knochella</i> , F.	<i>A. vipio</i> , Reinh.
<i>Solenobia inconspicuella</i> , Staint.	<i>A. sodalis</i> , Hal.
* <i>Stomopteryx anthydella</i> , Hübn.	<i>A. nigripes</i> , Ratz.
* <i>Tinea misella</i> , Zell.	<i>A. vipio</i> , Reinh.
<i>T. parasitella</i> , Hübn.	<i>A. parasitellae</i> , Bé.

TORTRICIDAE.

* <i>Argyroplote hercyniana</i> , Tr.	<i>A. cruciatus</i> , Ratz.
* <i>A. hercyniana</i> , Tr.	<i>A. flavilabris</i> , Ratz.
* <i>Argyrotoxa bergmanniana</i> , L.	<i>A. lugens</i> , Ratz.
<i>Cacoecia rosana</i> , L.	<i>A. ochrostigma</i> , Wesm.
<i>C. podana</i> , Scop.	<i>A. impurus</i> (Nees), Lyle.
<i>Eucosma aemulana</i> , Schläg.	<i>A. praetor</i> , Marsh.
* <i>Gypsonoma neglectana</i> , Dup.	<i>A. lictorius</i> , Reinh.
** <i>Laspeyresia leplastriana</i> , Curt.	<i>A. lineola</i> , Curt.
(on <i>Brassica oleracea</i>)	
* <i>Pandemis heparana</i> , Schiff.	<i>A. lugens</i> , Ratz.
<i>Phalonia ciliella</i> , Hübn.	<i>A. laetus</i> , Marsh.

British Museum (Natural History),
S. Kensington, S.W. 7.

The London Naturalist for the Year 1934.

Among the wide interests of the London Natural History Society, Entomology still holds quite a large share. An interesting paper by L. B. Prout, comparing the state of Entomology to-day with its condition in years gone by, is concerned less with entomologists than with the conditions under which they work, their aims and achievements, and the course and paraphernalia of research. H. J. Burkill contributes a long list of Plant Gall records, and a summary of information received concerning the butterflies. In the latter are references to hibernating *Vanessa atalanta*, to an (unconfirmed) record of *Melitaea athalia* at Leatherhead, to *Strymon w-album* in further fresh localities, to an apparent increase in the distribution of *Leptidea sinapis*, and to both species of *Colias*, amongst many other matters. There are notes on the Dragonflies by E. B. Pinniger, and a suggestive observation by J. A. Simes on the time of emergence of the pupae of *Papilio podalirius* related to their coloration. N. D. R.

Eton College Natural History Society: Annual Report, 1934-1935.

The entomological interest in this report lies principally in the records of Hymenoptera by M. W. L. Tutton, and Lepidoptera by Brig.-Gen. B. H. Cooke. With the acquisition of a bird sanctuary, however, an interesting analysis of the insect fauna of a small but clearly delimited area might perhaps be undertaken and lead to interesting results—if the ornithologists will allow it. The report clearly shows that Eton's Natural History Society is in a flourishing condition, young as it is. N. D. R.

GONEPTERYX RHAMNI L. : A NOTE ON THE LARVA.

BY H. J. BURKILL, M.A., F.R.G.S.

MR. FROHAWK, in his *British Butterflies*, published December, 1934, states on p. 338, "Throughout all its stages the larva rests on the upper surface of the leaf, lying in a straight position along the midrib."

My experience the last three seasons led me to take careful notes this last summer, and I found my opinions of 1934 were confirmed, and that the statement quoted above does not hold good in all cases.

As a result of this difference I made inquiries among friends, and Mr. Collenette very kindly supplied me with information copied out from the works of various authors, of which the following may be said to bear on the question :

(1) J. W. Tutt, *British Lepidoptera*, 8 : 75, says : "The somewhat allied larvae (to *P. brassicae*) of *Gonepteryx rhamni* and *Colias edusa* on the other hand feed by day, rest fully exposed, yet are most difficult to see, on account of their great similarity in colour, tint, etc., to their resting-places. On searching for the former on *Rhamnus frangula*, it is necessary that one should place oneself so that the sunlight falls across the leaves examined, when the shadowed side of the larva comes into view and discovers it ; otherwise it so exactly resembles the midrib along the centre of the leaf (where it rests) that it readily escapes notice."

(2) Barrett, *Lepidoptera of the British Islands*, 1893, 1 : 41, says : "The larva loves to lie along the midrib of a leaf, and its colour so closely harmonizes with that of the leaf that it is readily overlooked."

(3) South, *Butterflies of the British Isles*, 1906, p. 55, says : "It feeds in June and July on both kinds of buckthorn, and will generally be found resting on the main rib of a leaf."

These authorities do not say definitely that the larva is on the upper surface of the leaf, though the statements rather lead one to that impression.

The upper surface of the leaf of both species of *Rhamnus* provides a series of grooves as the mid and side ribs are depressed in the lamina, while the under surface has a corresponding series of ridges sticking out well from the lamina. It is under the shelter of these ridges that the very young larvae rest in their first instar. The colour of the young leaves is a brownish green on the under surface, and here the young larvae exactly match the background. They are so inconspicuous in this situation that when changing the food in the breeding jars I have had sometimes to go over the leaf three times with a pocket lens before I could find the larva that I knew was there.

The young larvae are brownish green in the first stage, becoming a purer green as the leaves also turn colour, so that the invisibility is continued for the rest of the larval life. I have four trees of *Rhamnus* in the garden, two of each species, and I have from time to time watched the female butterfly ovipositing on these, and at other times I have searched for larvae. Many others have been found on the North Downs. The best method seems to be to look where the leaves are eaten into holes and then get the damaged leaf up against the sky, when the larva will be disclosed as an opaque object on the translucent leaf.

My experience has been that the larvae when young are nearly always on the under surface. When they change colour they may move to the upper surface, but not always, and when in the last instar they prefer the lower portion of the midrib groove on the upper surface to rest in.

Of the larvae I took in 1935 out of doors, 60 per cent. were on the under surface and 40 per cent. on the upper surface. Observations on those larvae that I was feeding up in glass jars or in a wooden box with a glass lid gave 79.4 per cent. on the under surface and 20.6 on the upper.

The larvae are interesting to breed from the ova, as this change of colour corresponding to the change in the colour of the leaf shows a very fine example of protective resemblance.

Transactions of the Society for British Entomology. Vol. 2.

This volume of 234 pages, issued in two parts, complete with title-page and table of contents, but no index (perhaps one is hardly necessary), contains twelve papers of such varying interest that one can only say of them collectively that all are admirable. Chiefly or largely of faunistic interest are those of Goddard (Heteroptera at Slough), Grensted (Trichoptera of Oxford), Kerrich (Ichneumonidae), and Thornley (Cornish Diptera), Williams and Killington (Hemero-biidae and Chrysopidae at Rothamsted). O. W. Richards's paper on *Bombus muscorum* and *B. smithianus* not only gives the distribution of these two species, but also goes a long way towards explaining it. Walton's experiments on the flight of *Notonecta maculata* lead him to conclude that in flight this insect reacts automatically to sexual stimuli, moving towards water, or strong illumination, away from wind, and shows no "intelligence". Of much wider interest are the discussion by K. G. Blair of Wegener's Theory, and by Prof. Carpenter of Courtship and Allied Problems in Insects. Hobby's Bibliography of Local Lists continues; may one hope it will eventually have a subject-index? Also of wide interest, but in a different sense, is the excellent key to the Bruchidae of economic importance in Europe, which seems, however, somewhat out of place in this well-found volume.

N. D. R.

SOME RECORDS OF BRITISH TRICHOPTERA IN 1933.

BY MARTIN E. MOSELY, F.R.E.S.

DURING 1933 several small collections of British Trichoptera were presented to the British Museum (Nat. Hist.) by various kindly-disposed entomologists. Amongst them were collections made in Staffordshire by Mr. H. W. Daltry, on the Thames by both Mr. W. E. China and Canon L. W. Grensted, the former making in addition a collection on the River Mole at Fetcham, in Wales by both Canon Grensted and Dr. H. A. Baylis.

Of the Staffordshire collection, it suffices to mention the two local species *Neuronia clathrata* and (less local) *Stenophylax alpestris*, both from Burnt Woods. Mr. Daltry states that *S. alpestris* was extremely abundant that year, the insects issuing from the bushes in hundreds when disturbed.

Of the two Welsh collections, three species are worthy of mention. *Wormaldia subnigra*, taken by both Canon Grensted and Dr. Baylis, has hitherto been represented in the Museum collection only by a single example taken by myself, also in Wales, on a small stream flowing down the slopes of Brecknock Beacon. The second species, a single example of the curious variety of *Mystacides azurea* with unicolorous white antennae, was taken by Canon Grensted at Creselly in South Pembrokeshire. The variety is very widely distributed and occurs in the female sex only.* The third species was a minute *Philopotamus montanus* taken by Dr. Baylis at Talybont, in Merioneth, with a wing expanse of only 12 mm. McLachlan gives the expanse as 18–26 mm., so the Talybont example is unusually small.

In the following list the initials H. W. D. refer to Mr. Daltry, L. W. G. to Canon Grensted, H. A. B. to Dr. Baylis and W. E. C. to Mr. China respectively.

PHRYGANEIDAE.

Neuronia ruficrus Scop., Craddock Moss, Audley, Staffs, 30.v. 1928 (H. W. D.).

N. clathrata Kol., Burnt Woods, Staffs, 2.vii.1932 (H. W. D.).

Phryganea striata L., R. Thames, Oxford, 23.v.1933 (L. W. G.).

LIMNOPHILIDAE.

Glyptotaelius pellucidus Retz., Madeley, Staffs, 18.viii.1932 (H. W. D.).

Colpotaulius incisus Curt., Madeley, Staffs, 9.viii.1932 (H. W. D.).

Limnophilus flavicornis F., Madeley, Staffs, 9.viii.1932 (H. W. D.).

* Since this was written, the variety has been found in both sexes in the island of Barra, Outer Hebrides, by members of the Edinburgh University Biological Expedition in 1935.—M. E. M.

- L. stigma* Curt., Madeley, Staffs, 13.viii.1932 (H. W. D.).
L. centralis Curt., Madeley, Staffs, 18.viii.1932 (H. W. D.).
L. vittatus F., Burnt Woods, Staffs, 2.vii.1932 (H. W. D.).
L. auricula Curt., Burnt Woods, Staffs, 8.vii.1932 (H. W. D.).
L. sparsus Curt., Madeley, Staffs, 21.vii.1932, 15.viii.1932;
 Burnt Woods, Staffs, 8.vii.1932 (H. W. D.); Saundersfoot, S.
 Pembroke, 26.viii.1933 (L. W. G.).
Asynarchus coenosus Curt., between Leek and Buxton, Staffs,
 13.vii.1929 (H. W. D.).
Stenophylax stellatus Curt., Talybont, Merioneth, 16-25.viii.1933
 (H. A. B.).
S. alpestris Kol., Burnt Woods, Staffs, 2.vii.1932 (H. W. D.).

SERICOSTOMATIDAE.

- Notidobia ciliaris* L., R. Thames, Molesey, 17.v.1933 (W. E. C.).
Goëra pilosa F., R. Thames, Molesey, 17.v.1933 (W. E. C.);
 R. Mole, Fetcham, 18.v.1933 (W. E. C.).
Brachycentrus subnubilus Curt., R. Thames, Molesey, 29.iv.1933
 (W. E. C.).
Lepidostoma hirtum F., R. Thames, Molesey, 17.v.1933 (W. E. C.);
 Talybont, Merioneth, 16-25.viii.1933 (H. A. B.).

LEPTOCERIDAE.

- Leptocerus nigronervosus* Retz., R. Thames, Oxford, 20.v.1933
 (L. W. G.); R. Thames, Molesey, 17.v.1933 (W. E. C.).
Mystacides azurea L., Hafod-y-Llyn, Merioneth, 19.viii.1933
 (H. A. B.); Creselly, S. Pembroke, 18.viii.1933 (L. W. G.);
 St. David's, W. Pembroke, 24.viii.1933 (L. W. G.).
M. azurea var. *albicornis* Mosely, Creselly, S. Pembroke,
 18.viii.1933 (L. W. G.).
M. longicornis L., R. Thames, Oxford, 20.v.1933 (L. W. G.).

ODONTOCERIDAE.

- Odontocerum albicorne* Scop., Llanbedr, Merioneth, 11.viii.1933
 (H. A. B.); Haverfordwest, S. Pembroke, 24.viii.1933 (L. W. G.).

HYDROPSYCHIDAE.

- Hydropsyche instabilis* Curt., Cannock Chase, Staffs, 1.viii.1928
 (H. W. D.); Talybont, Merioneth, 16-25.viii.1933 (H. A. B.).
H. angustipennis Curt., R. Thames, Molesey, 17.v.1933 (W. E. C.).
Diplectrona felix McL., Saundersfoot, S. Pembroke, 11.viii.1933,
 5.ix.1933 (L. W. G.).

PSYCHOMYIDAE.

- Tinodes waeneri* L., R. Mole, Fetcham, 18.v.1933 (W. E. C.);
 Llyn-Cwm-Bychan, Merioneth, 26.viii.1933 (H. A. B.); Hafody-
 Llyn, Merioneth, 19.viii.1933 (H. A. B.).

Lype phaeopa Steph., R. Thames, Molesey, 29.iv.1933 (W. E. C.); R. Mole, Fetcham, 18.v.1933 (W. E. C.); Mynydd-Preselly, N. Pembroke, 5.viii.1933 (L. W. G.).

Psychomyia pusilla F., R. Thames, Molesey, 17.v.1933 (W. E. C.).

PHILOPOTAMIDAE.

Philopotamus montanus Don., Amroth, S. Pembroke, 26.viii.1933 (L. W. G.); Mynydd-Preselly, N. Pembroke, 3.ix.1933 (L. W. G.); Saundersfoot, S. Pembroke, 14.viii.1933 (L. W. G.); Talybont, Merioneth, 16-25.viii.1933 (H. A. B.); Llanbedr, Merioneth, 11.viii.1933 (H. A. B.).

Wormaldia occipitalis Pict., Burnt Woods, Staffs, 23.vii.1932 (H. W. D.); Eisingrug, Merioneth, 23.viii.1933 (H. A. B.).

W. subnigra McL., Llanbedr, Merioneth, 11.viii.1933 (H. A. B.); Mynydd-Preselly, N. Pembroke, 3.ix.1933 (L. W. G.).

POLYCENTROPIDAE.

Polycentropus flavomaculatus Pict., R. Thames, Molesey, 17.v.1933 (W. E. C.); R. Mole, Fetcham, 18.v.1933 (W. E. C.); Hafod-y-llyn, Merioneth, 19.viii.1933 (H. A. B.); Llyn-Cwm-Bychan, Merioneth, 26.viii.1933 (H. A. B.); Llandovery, Carmarthen, 3.viii.1933 (L. W. G.); Newbridge-on-Wye, Radnorshire, 28.viii.1933 (L. W. G.); Castlemartin, W. Pembroke, 19.viii.1933 (L. W. G.); Creselly, S. Pembroke, 18.viii.1933 (L. W. G.); Haverfordwest, S. Pembroke, 24.viii.1933 (L. W. G.).

RHYACOPHILIDAE.

Rhyacophila dorsalis Curt., R. Mole, Fetcham, 18.v.1933 (W. E. C.); Cannock Chase, Staffs, 2.ix.1932 (H. W. D.); Talybont, Merioneth, 16-25.viii.1933 (H. A. B.).

Agapetus fuscipes Curt., R. Mole, Fetcham, 18.v.1933 (W. E. C.); St. David's, W. Pembroke, 24.viii.1933 (L. W. G.).

HYDROPTILIDAE.

Hydroptila femoralis Eaton, R. Mole, Fetcham, 18.v.1933 (W. E. C.).

H. forcipata Eaton, R. Mole, Fetcham, 18.v.1933 (W. E. C.).

H. occulta Eaton, Castlemartin, W. Pembroke, 19.viii.1933 (L. W. G.).

H. sparsa Curt., Castlemartin, W. Pembroke, 19.viii.1933 (L. W. G.).

Oxyethira falcata Morton, Manorbier, S. Pembroke, 31.viii.1933 (L. W. G.).

NOTES ON BRACONIDAE: XV.—MICROGASTERINAE.

BY CLAUDE MORLEY, F.R.E.S., F.G.S., F.Z.S.

(Continued from p. 67).

- (146) 147. Legs very broadly marked with black { 71. *astrarches*, Msh.
71a. *gonopterygis*, Msh.
- (145) 148. Metanotum subglabrous, not at all rugulose.
- (150) 149. Abdomen strongly compressed; hypopygium exserted 72. *inclusus*, Ratz.
- (149) 150. Abdomen deplanate; hypopygium not exserted.
- (152) 151. Second abdominal segment shorter than third 73. *abjectus*, Msh.
- (151) 152. Second abdominal segment not shorter than third.
- (154) 153. Space between second segmental oblique sulci aciculate 74. *immunis*, Hal.
- (153) 154. Space between those sulci smooth.
- (156) 155. First segment half as long again as broad; hind femora pale 75. *caberae*, Msh.
- (155) 156. First segment hardly longer than broad; hind femora black 76. *popularis*, Hal.
- (144) 157. Apex of basal segment rounded and laterally contracted, twice as long as broad; terebra always visible.
- (171) 158. Basal segment hardly twice longer than centrally broad.
- (168) 159. Hind femora and tibiae testaceous, usually entirely.
- (159) 160. Metanotum rugulose and centrally carinate 77. *pallidipes*, Rnh.
- (160) 161. Metanotum subglabrous and not at all carinate.
- (163) 162. Metanotum always very distinctly punctulate 78. *bicolor*, Nees.
- (162) 163. Metanotum smooth, not at all punctate.
- (165) 164. Oblique sulci of second segment reaching apex; length 4 mm. 79. *formosus*, Wsm.
- (164) 165. Oblique sulci not reaching apex; length 2 mm. or less.
- (167) 166. Abdomen pale with anus black, $\frac{1}{2}$ longer than terebra 80. *lautellus*, Msh.
- (166) 167. Abdomen, except sides, black and double length of terebra 81. *umbellatarum*, Hal.
- (159) 168. Hind femora and tibiae black, entirely or mainly.
- (170) 169. First segment apically contracted from centre; length 2 mm. 82. *fraternus*, Rnh.
- (169) 170. First segment contracted from near apex: length $2\frac{1}{2}$ mm. 83. *triangulator*, Wsm.
- (158) 171. Basal segment nearly thrice longer than centrally broad.
- (173) 172. Hind coxae distinctly granulose and quite dull 84. *callidus*, Hal.

- (172) 173. Hind coxae simply finely punctate and nitidulous.
 (175) 174. Whole body for the most part rufescent (not British)
rubens, Rnh.
 (174) 175. Whole body entirely black throughout.
 (179) 176. Mesocalcaria arcuate; hind femora apically black.
 (178) 177. Metanotum laterally punctate; terebra half abdo-
 minal length 85. *lateralis*, Hal.
 (177) 178. Metathorax entirely glabrous; terebra very short
 86. *vitripennis*, Hal.
 (176) 179. Mesocalcaria straight; hind femora all testaceous
 87. *fulvipes*, Hal.

In the case of such numerous and closely allied forms as are the species of this genus, the above table is to be regarded as no more than a superficial guide to the detailed descriptions of authors cited, though indicating for the most part excellent structural characters that are discernible with any strong-powered lens. For the eight additional kinds described by Mr. G. T. Lyle reference is to be made to his articles in this magazine about 1917. In that year Mr. Lyle avowed himself quite unable to determine the name of any out of numerous *Apanteles* that I submitted for his opinion. It is probable that the whole of the palaearctic species occur in Britain; all are direct communal parasites of Lepidoptera.

With us the genus is ubiquitous ; 1308 specimens of it are in my collection.

1. *Apanteles solitarius*, Ratz.—I possess 7 imagines and 7 cocoons with the deflated larva of *Bombyx neustria*, whence they emerged at Odiham in Hants during 1910.

2. *A. salebrosus*, Msh.—One and its cocoon bred at Ely in August, 1901, and doubtless erroneously thought to have emerged from a Coleopteron (J. W. Cross); 3 and 5 cocoons on one leaf, bred from larva of *Scotosia undulata* at Oxshott (E. A. Cockayne); 9 and 15 cocoons, from *Selenia* sp. in 1903 (E. Goodwin); 6 and 16 cocoons, with dry larva of *Chrysophanus phloeas*, whence they emerged at Hartlepool in May, 1918 (J. Gardner); 13 and 6 cocoons from larva of *Eupithecia helveticata* at Milngavie in January, 1899 (Adie Dalglish). The species was captured at Reigate in Surrey during July, 1872 (Wilson Saunders, in coll. Morley); and I have found it at Groveley Wood in Wilts on June 27th, 1911. Marshall knew it, bred from *Liparis salicis* and *Hybernica defoliaria*.

3. *A. carbonarius*, Wesmæl.—New to Britain. I have a female, given me by his son, the late Edward, that has lain unnamed since taken at Reigate in July 1872, by Wilson Saunders.

4. *A. tetricus*, Rnh.—One and its cocoon emerged on May 27th, 1917, from a Lepidopteron from Delamere Forest, Cheshire (Mansbridge); 14 and 17 cocoons, with dry larva of *Maniola jurtina*, from

Barmouth, whence they emerged on June 15th, 1909 (Hugh Main). Shere (Dr. Edward Capron) and Greenings (Saunders) in Surrey; I have found it on *Heracleum* flowers from June to August at Shalfleet in Isle of Wight, Lyndhurst in New Forest, Shapwick peat moor in Somerset, and Waterford in Ireland.

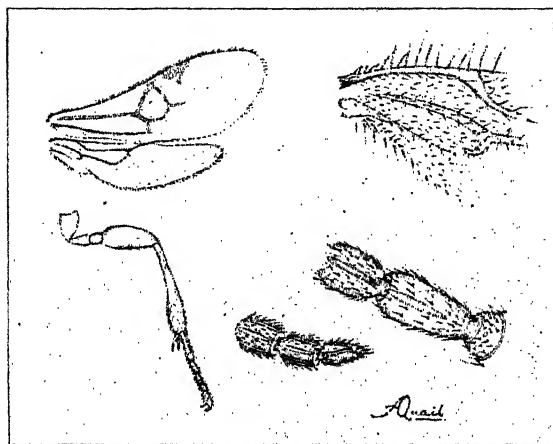
6. *A. ruficrus*, Hal.—I have 34 and some 50 cocoons from *Noctua brevilinea*, doubtless bred in Norfolk. Greenings in Surrey (Saunders); 3 at Kilmore in Ireland during August 16th–24th, 1898 (*ex coll.* Alfred Beaumont). “Bignell in 1891 bred 14 out of one larva of *Melitaea cinxia* from Switzerland” (MS. note in Marshall’s copy of his *British Braconidae*).

7. *A. ferrugineus*, Msh.—This most distinctive and interesting insect was first found by the late G. T. Porritt, of Huddersfield, by rearing a series of 29 ♂♀ from larvae of *Chilo phragmitellus* inside reed-stems, to the walls of which the parasites’ cocoons are lightly attached; no closer locality than “Angleterre” is given for these 29, which seem to have been sent to Germany, since *ferrugineus* is attributed to “Reinhard MS.” by Marshall (in both his monographs), who erroneously describes the hind coxae as “somewhat shining: un peu luisantes”; actually they are as dull and granulose as in any species of the *A. villanus* group, in which this one must be included. Next it was recorded (*Ent. Mo. Mag.*, 1888, p. 67) in Wicken Fen, Cambs, as reared from caterpillars of *Macrogaster arundinis* (*Phragmatocia castaneae*, Hb.: the sole parasite ever known to emerge from this moth and later overlooked by all Braconidae writers), whence “it would appear to confine its attacks to larvae feeding in the stems of *Arundo phragmites*. . . . I think it very probable that *A. ferrugineus* is not so scarce as it seems to be, but that its habits have screened it from observation”, says J. B. Bridgman, who seems never to have met with it in Norfolk, where it actually occurs at Ranworth Broad, etc. (*Trans. Norf. Nat. Soc.*, 9: 601). Imagines are on the wing from May 20th to June 23rd only, when I have swept them from reeds at Barton Mills (identified as “*ferrugineus*, Reinh.” by Marshall), Tuddenham Fen and frequently, though never copiously, in Brandon fens, all of which places are in Suffolk, though connected by fens with Cambs along the Rivers Lark and Little Ouse. But there is a second brood, for G. W. Clutten in 1907 sent me 5 cocoons on August 31st that had just emerged at Burnley from *Nonagria geminipuncta*; the first imago was emerged and dead on October 1st, and the other 4 before the 25th of that month.

8. *A. ordinarius*, Ratz.—Sixty-four, with a single female of the hyperparasitic Ichneumonid *Pezomachus instabilis*, Fst., were bred in August, 1905, from a common cocoon *ex* some large *Noctuid* larva feeding on *Berberis* at Larche (Basses Alpes: Dr. T. A. Chapman).

Seven cocoons, whence 2 imagines had emerged by the following May 4th, were sent from Ely, bred from *Hadena oleracea*, in October, 1900 (J. W. Cross); and I have several other rearings of this common species. Taken on muddy leaves in a pond at South Brent in Devon (DelaGarde); Shere in Surrey (Capron); Banchory in Aberdeen (E. A. Elliott); Louth in Lincs; and Wissett in Suffolk.

9. *A. congestus*, Nees.—Sixteen and a bundle of cocoons, with shrivelled larva of *Taeniocampa gracilis*, whence it emerged at Wisley in Surrey on June 24th, 1910 (R. South); 49 and bundle of cocoons bred at Camberley in Surrey on September 5th, 1917, from ? *Euclidia mi* (E. E. Green); 58 and 3 bundles of cocoons, with



Apanteles analis: Fore and hind wings and hind leg, enlarged $\times 50$.
Base of hind wings, and basal segments of antenna and terminal segments of same. Enlarged $\times 200$.

dry larva of *Melanchra pisi*, L., whence all had emerged at Southern-down in Glamorgan in August, 1913 (C. G. Clutterbuck); 1 and 2 cocoons from moss on ash at Drimnin in Argyll during May, 1908 (W. Renton); also bred at Ipswich. Imagines from Tilgate Forest in Sussex (E. A. Newbery); and Brandon in early June, but uncommon on the wing (cf. *Trans. Norf. Nat. Soc.*, 5: 64).

10. *A. bignelli*, Msh.—Eight and 2 bundles of cocoons were bred from *Leucania straminea* at Withycombe near Taunton in Somerset, during August, 1907 (H. Slater). "Also sent from Limerick, bred from *Melitaea aurinia*, by F. Neale of 35, Catherine Street" (Marshall's MS.). I have captured no more than a single female, at Southwold on the Suffolk coast on September 3rd, 1928.

11. *A. analis*, Nees.—So long ago as 1901 Ambrose Quail sent

me 4 specimens of this species and its cocoons, along with annexed figure, but in the interim his details have become misl though not lost (*cf.* Quail in *Trans. N. Zealand Inst.*, 1901, **33** : 11 where is also described as new, under the name *Mymar crinsa* Quail, the common palaearctic Proctotrypid, *Prophanurus phainarum*, Nees, *Hym. Mon.*, 1834, **2** : 287 and 435, ♂♀). Fem were bred from *Abraxas grossulariata* at Herne Hill, London, May 14th, 1910, by Rupert Stenton, who adds, "This Braconid is host of the hyperparasitic Ichneumonid *Mesochorus olerum*, Cur Captured at Olveston near Gloucester in April, 1914 (J. H. Ch bonnier); on golden-rod in Monks Soham garden, Suffolk, etc.

(To be continued.)

NOTES AND OBSERVATIONS.

DANAUS PLEXIPPUS IN SOUTH CORNWALL.—On September 25 last my friend, Mr. Arthur T. Cummings, while walking with niece at Coverack, noticed a specimen of this butterfly, which flew quite close to them.—F. PENNINGTON; Reform Club, Pall Mall S.W. 1.

VANESSA ATALANTA IN MARCH.—A specimen of *V. atalanta*, good condition, was seen by my sister, Miss H. E. Busbridge, on the wing in Sevenoaks on March 10th last. The weather was fine and warm at the time.—WILLIAM E. BUSBRIDGE; "Gresham", Brabourne Park Road, Sevenoaks.

SPHINX CONVULVULI IN DORSET.—A specimen of *Sphinx convulvuli* was taken at Osmington, Dorset, by some school-children on September 25th, 1935, and brought to me in good condition.—A. I. CAPENER; "The Limit", Osmington, Weymouth.

LARENTIA OCELLATA LARVAE AND AGLAIS URTICAE UNAFFECTED BY FROST.—On the night of November 29th, 1935, following several sharp frosts, I saw a few half-grown larvae of that hardy and partially double-brooded species, *Larentia ocellata*, feeding strongly in a very exposed position. I took one and it spun its cocoon on December 17th. Sharp frosts on the first three nights of March 1936, did not keep *Aglais urticae* indoors, for on each of the succeeding days I saw two specimens in flight. They loved to bask on freshly dug soil, evidently absorbing both heat and moisture.—P. P. MILMAN 14, Lower Conway Road, Paignton.

BUTTERFLIES IN NORTH LANCASHIRE, SECOND BROOD ERYNNIS TAGES.—Whilst collecting at Cark, North Lancashire, on August 21st, 1935, I took a perfectly fresh specimen of *Erynnis tages*. Mr. C. A. Cheetham, F.R.E.S., who was with me at the time, said he had seen one also, possibly the one I took, as I did not see another either on this or subsequent visits. I consider it more likely to be one of a

second brood than a delayed emergence of the first, as these were out in early May and getting very worn by mid-June. I have noticed occasional records of a second brood in the south of England, but it is certainly exceptional in the north. I have never seen one before, even in the hottest summers.

Other butterflies seen on the same or subsequent days were: *Pieris brassicae*, *P. rapae*, *P. napi*. *Colias croceus* (7 ♂♂, 2 ♀♀): We had a small invasion in 1935; in 1934 it missed us, but in 1933 was more common. *Gonepteryx rhamni* (1 ♂ seen). *Aglais urticae* seems to be increasing in numbers after being comparatively scarce for some years; I was successful in taking four var. *polaris*, along with a variety with the inner portion of middle costal blotch united by a black crescent mark to the second or lower of the outer spots. *Nymphalis io*, fairly common. *Vanessa atalanta*, several, but much scarcer than in 1933-1934. *V. cardui*, few, also scarcer than in the two previous years. *Eumenis semele*, common but very worn. *Maniola jurtina*, in similar condition. *Pararge aegeria*: This butterfly has been rare here for over a dozen years, but is now recovering, and I have seen it in many parts of the district this year. *Lycaena phlaeas*, common, some worn, others quite fresh, probably the beginning of the third brood; I took a fine fresh male without the band on hind wings and with a well-developed tail, which contained a spot of the copper colour, a modification of var. *radiata*. Another, very similar, was taken by Mr. Cheetham's nephew. *Polyommatus icarus*, common, with some blue females; on July 6th, at Grange, I found at rest a fine variety, near *persica* (Bienert), without any spots on undersides, except the central ones; the ground-colour is, however, very dark brown, but the borders near the fringes almost white, making a really striking var.; on the same evening I took one with almost spotless hind wings, but with the usual complement on fore wings.

It might be well to put on record that a specimen of *Argynnis paphia* was taken at Arnside (Westmorland) on July 24th, by Mr. L. A. Hayward, of Wallington, Surrey, who was spending his holiday here. He showed it me within two hours of having taken it. It was in a bottle along with other captures. I went the following week and thought I saw one on July 29th, but it evaded capture. The flight was very different from that of *A. cydippe*, which was flying also. On other visits I did not see it again. Whether it is native there, or an escape, we shall have to determine in the future.—ALBERT E. WRIGHT; Brunleigh, Grange-over-Sands, October 21st, 1935.

DIPTERA IN DUMFRIESSHIRE.—I have four species of Fungus Gnats from this district kindly named for me by Mr. H. Britten. These are *Sciara carbonaria* Mg., *S. caudata* Walk., *S. hyalipennis* Mg., and *S. thomae* Lin. They were all taken in April to June and are probably common, the last certainly so. *Scatopse notata* Lin. is frequent all summer, sometimes occurring on windows. *Dilophus*

albipennis Mg. frequents the flowers of Hawthorn in June. Unfortunately the hedgerows here are so cut back that we seldom have the pleasure of seeing much blossom or enjoying its fragrance. *Bibio nigriventris* Hal., both sexes common towards the end of May. *Anopheles plumbeus* Steph., occasionally on windows in my home. *Tipula maxima* Poda: This fine "Daddy" occurs singly and at intervals on Newton Moss in summer. *Beris chalybeata* Först. is very common in May and June. *Chrysometus bipunctatus* Scop., one taken in the sweepnet on the edge of a wood at Nutberry Moss in September. This is one of the most beautiful flies I have ever taken. It is apparently rare here, and Mr. J. Collins writes me that it is also rare in the Oxford district. *Leptis scolopacea* Lin. is much less frequent with me in the Gretna district than is *L. tringaria* Lin. *Tachypeza nubila* Mg. not common. I swept one on Nutberry Moss September 6th, 1935, and captured a pair on Newton Moss running on a low branch of a Scotch fir tree. *Sciaphus platypterus* Fab.: This delicate fly is not rare in grassy lanes, and in damp locations on the mosses in June and July. *Hercostomus nigripennis* Fln. is not uncommon along the edges of woods and in fields. *Chrysotus gramineus* Fln., at Nutberry and elsewhere in July and August; not rare. *Gymnopternus aereus* Fln. common from May to August, frequenting rough low herbage in moist localities. *Sympycnus annulipes* Mg., Newton Moss, common in June on marshy ground. *Campsicnemus loripes* Hal. on Nutberry Moss in September and Newton Moss in October. Quite common in these localities. One of my specimens from the latter locality is dated October 30th, 1931. Lundbeck in *Diptera Danica* says it is rare on the Continent in July and August. *Dolichopus popularis* Wied. hardly rare on Raeburn Flow and other mosses in June. *Verrallia pilosa* Zett., a specimen in my garden on June 25th. *Leucozona lucorum* Lin. frequents Umbels in summer and is not rare. *Syrphus vitripennis* Mg., a frequent visitor to my garden in June. *S. latifasciatus* Mcq.: This I have taken on dandelion flowers in May and it is again common in autumn. Another fly I have taken occasionally at dandelion flowers is *Chilosia fraterna* Mg. *Bucentes geniculata* De G., fairly common in summer; a parasitic species. *Calobata ephippium* Fab. common in June, although I have taken it so late as August 22nd. A pretty fly with short wings and long legs on which it is very active. *Tephrites vespertina* Low. occurs occasionally in moist situations from May to August. *Sapromyza longipennis* Fab. at flowers of Blackthorn in May.—JAS. MURRAY; 6, Burnside Road, Gretna, Dumfriesshire.

RECENT LITERATURE

Proceedings and Transactions of the South London Entomological Society, 1934-1935.

Fortunately the worth of this annual volume is so well known as to make an attempt to analyse its contents quite unnecessary. The first sixty pages (the proceedings of meetings, both at Hibernia

Chambers and in the field) are packed with observations. These are followed by an admirably-balanced presidential address by Mr. T. R. Eagles, surveying various theories of evolution that are in vogue, and pointing out that, far from being mutually antagonistic, they are in reality but parts of one great whole. In the *Transactions* the micro-lepidopterists, refreshingly, have it all their own way, contributing nearly half the papers; the Macros, however, have four, if the late Mr. Adkin's most interesting account of lost suburban hunting-grounds can be included, and amongst them is a very full discussion of the genus *Taeniocampa*. Cecidologists have two papers, the Megaloptera one. As always, there is an excellent index. The Society goes steadily forward in numbers, activity and usefulness, and it is welcome news that its field meetings are at last becoming popular again. It is a curious commentary on human affairs that the publications of the old South London are more strictly devoted to British Entomology than, at present, are those of the 'society for' that branch of our science.

N. D. R.

The Locust Outbreak in Africa and Western Asia in 1934. By B. P. UVAROV. (H.M. Stationery Office.) Price 3s., postage extra.

This survey is the fourth in the series, the previous surveys having covered the years 1925 to 1933. It is based on the analysis of the very numerous reports received by the Imperial Institute of Entomology as the international centre for this work, and covers three of the species concerned in the present outbreak, namely the Desert Locust (*Schistocerca gregaria*), the Tropical Migratory Locust (*Locusta migratoria migratorioides*) and the Red Locust (*Nomadacris septemfasciata*). The fourth species, the Brown Locust (*Locusta pardalina*), has so far confined its attentions almost entirely to the Union of South Africa, and it has therefore not been brought within the scope of these surveys. It would appear that there was a lull in the activities of the Desert Locust in 1933, but in the winter of 1934-35 some signs of the approach of a new swarming period were observed. This is the most northerly of the species. The Tropical Migratory Locust is in its eighth year of swarming, and may be expected to continue for another two years; but of the Red Locust Dr. Uvarov anticipates swarming to continue for some years to come, possibly with intensification in certain areas such as Angola, Portuguese East Africa, and the recently invaded Lower Congo basin. The author's concluding words are not comforting, but they serve admirably to emphasize the necessity of continuing, swarms or no swarms, the scientific inquiry he is so ably directing: "A period when no swarms of any species will be present in the whole Continent may be long in coming. It is even probable that there are no such periods, and that it was only due to the absence of adequate observation that they were thought to have recurred in the past. This would mean that the danger from locusts is not temporary, but permanent, and that no temporary measures could ever avert it."

N. D. R.

Biological Processes in Tropical Soils. By A. S. CORBET. Cambridge, 1935.

One needs to be a planter, chemist, mathematician, geologist, botanist and zoologist to get the best out of this book, but even the entomologist can find quite a little to interest him. Dr. Corbet is already, jointly with H. M. Pendlebury, author of an admirable book on the *Butterflies of the Malay Peninsula* (see *Entom.*, 67 : 286), and in his general discussions makes some use of his special knowledge of the insect fauna of this region. His references to Termites, besides making mention of the essential part they play in effecting the destruction of timber and other plant debris, include fresh observations of his own on *Coptotermes curvignathus* of considerable economic importance. He shows that this species can kill *healthy* three-year-old rubber trees within a month, and he describes the method. Many other insects are briefly dealt with in the account of the soil fauna. One of the author's most generally interesting statements is that based upon the behaviour of culture bacteria. These colonies "grown in pure strains at a constant temperature, after an initial lag period", show a "rapid increase in the population until, following a brief stationary phase, the numbers decline until the whole colony becomes extinct". Dr. Corbet maintains that plant and animal populations follow these same growth laws, under conditions of constant mean annual temperature and a closed system. It looks as if the famous advice of a much-harried economic entomologist in the tropics "to leave it to Nature" was quite right, except that he couldn't guess how long the cycle of his pest would last. Are these growth laws more than a restatement in different form of what is generally taken for granted ?

N. D. R.

Colorado Beetles at Tilbury: III.

In J. C. F. Fryer's previous report (see *Entom.*, 68 : 170) it was stated that then, in February, 1935, no place in this country was known to be infected. The very thorough inspections carried out during 1935 failed to disclose any trace of the pest. But, so that this happy condition should not lull us into a false feeling of security, the author calls attention to the finding of a solitary living beetle on a lighter in the Surrey Commercial Docks, and stresses the continued spread of the beetle towards the north and east of France.

N. D. R.

Public School Explorers in Newfoundland. By DENNIS CLARKE. London, 1935. 10s. 6d.

This is a very happy account of the first public school expedition to Newfoundland, in 1934, written in a style which well reflects the spirit of the party. To its members it must now appear a great event to look back upon, but it is not going too far to say that one member very nearly lost his chance of this retrospect, as a result of getting lost. If the sequence of events is at times a little difficult to

follow, one must remember that not one, but several parties were operating more or less simultaneously, and none of them seems to have been by any means a "joy-ride". Commander Murray Levick is undoubtedly a very brave man; his team never shied. Whilst his and other parties were away surveying, Stainer and Armstrong succeeded in getting together quite a useful entomological collection, which they detail in an appendix. These specimens, though not very numerous, were generously presented to the British Museum (Natural History), where it was found that many of them were not previously represented there, and some probably represented new species. The lists of these species are supplemented by a number of observations on habits, which considerably add to their interest, and are further proof of the very thorough manner in which the whole expedition was organized and carried through. A very valuable training for all who took part in it.

N. D. R.

Malvern College Natural History Society: 12th Report, 1935.

It is a long gap since 1914, when the last of these reports appeared. As far as entomology is concerned, the most important point about this issue is the proof it carries that interest in insects and spiders still survives in Malvern.

N. D. R.

SOCIETIES.

ROYAL ENTOMOLOGICAL SOCIETY OF LONDON.—*Annual Meeting.*—*Wednesday, January 15th, 1936.*—Dr. S. A. Neave, O.B.E., President, in the Chair.—Mr. A. W. McKenny-Hughes, Secretary, read the names of Fellows nominated as Officers and Council for the ensuing year, and announced that they had been duly elected in accordance with the Bye-Laws. The Secretary read the Report of the Council, which was adopted on the motion of Mr. H. Willoughby-Ellis, seconded by Mr. J. E. Collin. The Treasurer, Mr. Francis Hemming, C.B.E., read his report, and this, with the accounts for the year, was adopted on the motion of Dr. C. B. Williams, seconded by Mr. H. M. Edelsten. The President read his address, after which a vote of thanks to him, coupled with the request that the address might be published in the *Proceedings* was moved by Dr. K. Jordan, and carried unanimously. A vote of thanks to the Officers for their services was passed on the motion of Prof. G. D. Hale Carpenter, seconded by Mr. R. W. Lloyd, and carried unanimously. Mr. A. W. McKenny-Hughes and Mr. Francis Hemming briefly replied. Mr. Francis Hemming, on behalf of Fellows and friends of the Society, offered a portrait of Dr. Neave and a book containing the signatures of subscribers to be presented to Dr. Neave in recognition of his long service as an officer of the Society. Mr. R. W. Lloyd, as one of the senior Fellows, supported Mr. Hemming, and Dr. Neave

expressed his pleasure in accepting this indication of the Society's good wishes.—A. W. McKENNY-HUGHES (*Hon. Sec.*).

ENTOMOLOGICAL CLUB.—The Verrall Supper Meeting, under the auspices of the Entomological Club, was held at the Holborn Restaurant on January 14th, 1936. The meeting was called for 6.30, when the usual conversazione was held in the reception room, and dinner was served at 8 o'clock, Mr. H. Donisthorpe in the Chair. 174 acceptances of the invitations issued were received and 172 sat down for dinner. This was four less than last year, and there were some noticeable absentees. Mr. G. T. Bethune-Baker, who has always taken so much interest in the gathering, was unable to come. Mr. F. W. Frohawk, who has not missed an attendance for 45 years, was unfortunately still too ill to be present, and Sir E. B. Poulton, who is the sole survivor of those who were invited to the first supper given by Mr. Verrall in 1887, was absent abroad. After the toast of "The King" and the silent toast of Mr. Verrall, the founder, the guests freely intermingled at the tables and continued to spend a most enjoyable evening. The gathering continues to be very successful, and it is understood that a considerable number of entomologists are anxious to join the gathering and become subscribers, and it is necessary here to state that no invitations can be issued without first applying to Mr. J. E. Collin, of "Raylands", Newmarket, the Verrall Supper Member of the Entomological Club, who is responsible for the whole of the organization. Appreciation was expressed on all hands of the excellent arrangements, which were very complete, and Mr. Collin is to be congratulated on the great success of the gathering, which every year is due to his forethought and organization.—H. WILLOUGHBY-ELLIS (*Hon. Sec.*).

BIRMINGHAM NATURAL HISTORY SOCIETY: ENTOMOLOGICAL SECTION.—January 20th.—*Pocket-box and Exchange*.—Prof. Beckwith Whitehouse in the Chair.—Twelve members present.—Mr. J. H. Grant showed three British specimens of *Dysauxes ancilla* L. (from Hartley-Wintney, New Forest, 1860). Prof. Whitehouse showed a series of about a dozen *Boletobia fuliginaria* L., bred last year from Berkshire, also a long varied series of *G. comes* Hübn. (*orbona* Fabr.) from Kerry stock. Mr. K. Davison showed species of *Delias*, Mr. L. Evans varieties of British Rhopalocera, Mr. F. H. Lees an interesting selection of Lepidoptera from Streetly, Staffs, and Mr. S. E. Carlier showed and made remarks on teratological specimens of Lepidoptera and Coleoptera. Mr. Sutton showed a fine *L. loreyi*, taken by him at Paignton, September 19th, 1924. Mr. Siviter Smith showed a selection of insects taken in 1935, including *D. albimacula*, *S. alpinalis*, *P. minorata*, *P. ridens*, *A. cinerea*, *P. leucophaea*, *C. paludata* var., *A. euphrosene* vars., etc., and also gave a demonstration of a method of removing grease from Lepidoptera.—P. SIVITER SMITH (*Hon. Corresponding Sec.*), Pebworth, Stratford-on-Avon.

THE ENTOMOLOGIST.

VOL. LXIX.]

MAY, 1936.

[No. 876

BULGARIAN RHOPALOCERA, JUNE AND JULY, 1933.

BY P. HAIG THOMAS.

THIS year was a most unfortunate one to have chosen for collecting butterflies in Bulgaria, owing to the fact that the winter had been the worst for fifty years, and that the weather remained cold with strong winds and much cloud till the middle of June. Most insects were three weeks late in emergence, and this state of affairs continued till I left on July 26th. Even at this date there were no insects flying above 7200 ft. on Mt. Belmeken in the Rhodope Mts. In fact at and above the little lake, 1500 ft. below the summit of Belmeken, which I visited five times, I found nothing till my last visit on July 25th, when I took four *Argynnis pales* and one fresh but crippled *Erebia lappona*. At this height on July 8th, 1929, *Erebia oeme* and *Erebia epiphron* v. *orientalis* were well out.

Travelling from Sofia by night I arrived at Sliven early on May 31st. *Everes decolorata* was just emerging though scarce, and it was still emerging on June 24th. *Aricia anteros* appeared first on June 3rd, and soon became the commonest Lycaenid in all the gorges. On this day I took a single fresh male *Pieris krueperi* in the big gorge to the east of the Dry Gorge at 1500 ft. A few days later Dr. Binder, an Austrian, arrived to collect for a fortnight; he informed me that in the previous year he had taken one male *krueperi* on July 12th and one female on July 17th in the Mill Gorge. The next day, June 4th, we went together to the same locality, and took a worn female of the first generation and a fresh male of the second at an altitude of 1200 ft. Subsequently we took eight more in this locality and I took three others half-way up the Dry Gorge. Dr. and Mrs. Higgins found *krueperi* well out on July 14th at Karlovo, a small town at the foot of the Balkans due north of Philipopolis and a hundred kilometres west of Sliven. The altitude of *krueperi* in the Balkan range appears to be between 1000-1500 ft. The Gorge beyond the Dry Gorge, which is only one hour's walk from the hotel, is undoubtedly one of the best localities at Sliven. I first took *Erebia medusa* here on June 5th, and it was still flying fresh and very common at Karlovo on July 17th from 2000-5200 ft. *Synchlora chloridice* occurred in all the gorges at Sliven except the Prison Gorge, and was as common in the middle of the Mill Gorge as in the Dry Gorge, but owing to the steepness of the ground in the former,

it was not so easy to take there. I took the first generation mostly worn on June 5th. The second generation, which was much larger, was well out on June 24th. I took a female ovipositing on a small plant not over 6 in. high with narrow pointed leaves, small yellow flowers and upright growth; unfortunately the plant I gathered shrivelled up before I got it back to the hotel to press; this plant was common all over the dry, stony slopes. *Lycaena dispar rutilus* was found in all the gorges. I left Sliven on June 20th for Kostenitz to join Dr. and Mrs. Higgins and we returned to Sliven for three days on June 24th, where, owing to the lateness of the season, they were able to obtain specimens of all the insects I had taken except *Zerynthia polyxena* and *Leptosia duponcheli*.

I was at Kostenitz from June 20th till July 25th, except for two short visits to Sliven and Karlovo; during the first part of our visit, owing to the very restricted nature of the collecting ground collecting was rather disappointing. On June 26th in the lower part of the gorge only the earliest spring insects were flying, such as *Anthocharis cardamines*, *Erebia medusa* and *Carterocephalus palaemon*. A few of the *cardamines* had the rudiments of a hooked tip to the fore wings, reverting to *v. orientalis*. At this date, except for the field at the back of the Hotel Renaissance, Cherkivessch, a hill on the left of the road just below the village leading to the station was the only ground. Insects did not appear freely in the gorge till July 10th. Except Cherkivessch and the east side of Lime Tree hill, which was frequented by flocks and fierce dogs, the rest of the low hills are completely covered with dwarf scrub oak. The sides of the gorge and the slopes of the Rhodope are clothed with large forest trees up to 6000 ft. Except for a few alpine meadows from 6000-7500 ft. the mountains are covered with dense-growing *Pinus montana*, through which it is impossible to penetrate.

Colias myrmidone was flying fresh on Cherkivessch on June 21st, but was difficult to catch; males were common on the steep birch-covered slopes above and below Canton in the gorge from July 15th, but females were still scarce when I left. *Erebia oeme*, *E. aethiops*, *E. euryale* and *E. ligea* all appeared on July 18th, but except for *E. oeme*, were all scarce. On July 24th I found *E. epiphron v. orientalis* flying with *E. oeme* in the open ground on the left of the path to Belmeken, and on the other side of the stream from 5200-5600 ft.; on this and the following day I obtained a good series of males, but only three females. We took a few *Argynnis graeca* flying with *A. selene* from July 10th, between 5000-6000 ft., while *A. pales* did not appear till July 24th, at 7200 ft.

Karlovo, an exceptionally nice place to stay at, was very good collecting-ground; we came here on July 14th and stayed four days. Our chief object was to obtain *Erebia ceto* v. *phorcys*, but except for one male taken by Dr Higgins, we failed to find it. Evidently it had not yet emerged, as it is usually common here, though local, about the middle of July. We found male *Argynnis aphirape* common and fresh, also some very dark. *Melitaea athalia*, *Agrodiaetus admetus*, *Satyrus cordula* and the second generation of *L. duponcheli* were common. A visit here earlier in the year would most likely prove of considerable interest.

On my return to Sofia, Dr. Buresch, whose kindness and help did much towards the success of our trip, told me that *Erebia rhodopensis* would not emerge on Mt. Musallah till the middle of August, so reluctantly and with great regret at leaving Bulgaria I returned home with the capture of 124 species.

The following insects were taken :

Iphiclides podalirius, S., Kos., Kar.*

Papilio machaon, S., not common, Kos., Kar.

Parnassius apollo, S., not emerged, Kos., Kar.

P. mnemosyne, S., a very large race, Kos.

Zerynthia cerisyi, S., first seen June, later very common, one female, Kar., July.

Z. polyxena, S., one or two just first days of June. Larvae abundant. Insects very large.

Aporia crataegi, S., Kos., Kar, everywhere commoner than I have ever seen it.

Pieris brassicae, S., Kos., Kar., scarce everywhere.

P. kruegeri, Kos., Kar., not common. I think this insect flies in more than two generations, earliest date June 3rd, second generation, Kos., latest date July 16th, Kar., and last year Dr. Binder took it on July 17th. These specimens are smaller than those from south of Greece.

P. rapae, S., Kos., Kar.

P. manni, S., Kos., Kar. First generation nearly over beginning of June and second, *P. rossii*, emerging. Fresh at Kar. middle of July.

P. napi, scarce at S., common Kos., Kar.

Pontia daphidice, a migration of this insect appeared in June at S., a large form and very common, a few at Kar.

Synchlōe chloridice, S. only, common, Mile Gorge, Dry Gorge and Large Gorge, but local.

Euchlōe orientalis Brem (*belia*), S. only, not common.

* S. = Sliven, Kos. = Kostenitz, Kar. = Karlovo.

BRITISH LEPIDOPTERA COLLECTING, 1935.

BY C. G. M. DE WORMS, PH.D., F.R.E.S.

VERY little collecting was attempted before early March. On the 2nd of the month *Apocheima hispidaria* was already well on the wing in the local woods, and was much in evidence at light on several occasions during the subsequent fortnight. The sallows were well forward by the middle of the month, and provided some quite good harvests on a few visits paid to an area on the edge of the Bagshot Sand during the latter half of March. Some friends and myself were fortunate enough in beating eight examples of *Orrhodia rubiginea*, including five females, three of which laid well during the next few weeks. Good series of this insect were eventually bred from this source. Among the many species observed at sallow bloom, *Panolis piniperda* was more plentiful than I have ever known it, whereas *Taeniocampa incerta* was comparatively scarce. On April 1st I visited the woods in the Chiddingfold district in company with Messrs. A. G. Russell and H. Lawson. The night turned out to be extremely propitious for sallow collecting. Insects were in great numbers, in particular *Taeniocampa miniosa*, of which we obtained a very fresh and varied series. *T. munda* and *Pachnobia rubricosa* were also in plenty. We also secured one example of *Aleucis pictaria*.

On the 5th I travelled to Folkestone. On the following day I found larvae of *Callimorpha dominula* as numerous as ever along the cliffs in the neighbourhood of Deal. Sallow beating on the same night in the Ashford area only provided *Taeniocampa gracilis*, *T. miniosa*, *T. munda* and *T. populeti*. On the way home on the 8th I again visited Chiddingfold and obtained a few more *Aleucis pictaria* under very moist conditions. The next three days I spent in the Huntingdon district, but my stay coincided with an extremely cold snap. No profitable collecting was possible and I came away empty-handed.

For the third year in succession I paid a visit to Scotland over the Easter holiday. Travelling north by rail on the night of April 12th, I reached Struan the following morning and spent the next five days in this locality. Daily searches along the railway during this period produced only four male and eight female *Nyssia lapponaria*, whereas in the previous season this species had been quite abundant about this date. Sallows were well out and yielded some good bags each evening. *Taeniocampa gothica* was very plentiful and provided some very rich forms, including a small percentage of very extreme f. *gothicina*. *T. incerta* was as usual also in good numbers and very variable. The *Calocampas* and *Pachnobia rubricosa*, so numerous in previous

seasons at this period, were almost entirely absent. I moved on to Aviemore on the 18th and stayed over Easter till the 23rd. Night collecting was fairly good. The usual *Taeniocampas* were to be found on the willows, as well as a fair sprinkling of *Panolis piniperda*. The first *Endromis versicolor* were seen on the night of the 19th hanging to small birches on which larvae of *Aplecta tincla* were feeding in fair numbers. On April 20th I paid a daytime visit to the Culbin Sands, near Forres, but could find only a few larvae of *Dasychira fascelina* feeding low down on broom bushes. Insects seen by day at Aviemore included *Lobophora carpinata* and *Brephos parthenias*, slightly different from the southern race.

I retraced my steps of the two previous seasons and again visited Witherslack, arriving on the evening of the 22nd. In two nights' collecting I obtained only a few *Lobophora polycommata* just emerging up the ash stems; *Pachnobia leucographa*, however, was by this time nearly over. I proceeded to Conway in North Wales on the 24th, where I was joined by Mr. H. Lawson. We had a very pleasant and warm sojourn till the 27th. On the 25th, by dint of much searching of the heather clumps in the Sychnant Pass we managed to find only four nearly full-fed larvae of *Noctua ashworthii*, feeding quite conspicuously in the sunshine. This was our total "bag" of this species, which was apparently abnormally scarce this season. By night, larvae were to be found in great profusion on the heather. Among those of the Noctuidae, small larvae of *Agrotis agathina* were much in evidence, but none of these was eventually bred. They seem to require exact open-air conditions for this purpose. Geometrid larvae were very numerous, from some of which I subsequently bred several *Scodionia fagaria* (*belgiaria*). By the sea, larvae of *Leucania littoralis* were once more to be found under nearly every clump of marram-grass, but we came across only one solitary male *Nyssia zonaria*.

I returned home on the 27th and did a good deal of intermittent night collecting during the next few weeks. It happened to be a very good year for *Polyphoca ridens*. I took one of this species on this date in the Berkshire woods, together with a single *Drymonia chaonia*. I travelled to the New Forest on the 28th, but had a very meagre catch. On the following day, however, I found larvae of *Euphydryas aurinia* in good numbers near Blandford. On the next two nights, 29th and 30th, I took at light in the Bagshot area *Pheosia dictaeoides*, *Notodonta trepida* and *Cucullia chamomillae*.

Lophopteryx carmelita was very scarce, only two examples being taken during this period.

The Jubilee week-end and holiday was very fine and afforded a good opportunity for some profitable collecting. I was in the Lewes area on the night of May 4th. *Polyploca ridens* was a fairly frequent visitor to light. Several of the Notodontidae were also taken, as well as *Boarmia consonaria*. The 5th was a brilliant day with many butterflies on the wing, among which were *Leptidea sinapis*, *Pararge aegeria*, *Syrichthus malvae*, and *Lycaenopsis argiolus*. On May 12th in the Lewes district there were still a few *Polyploca ridens* at light, as well as *Notodonta trepida* and *Pterostoma palpina*. During the subsequent week the record cold snap, which had a serious effect on the Lepidoptera during the later part of the season, prevented any collecting. On the 18th a visit to Boxhill provided a few larvae of *Lithosia deplana*, and *Boarmia abietaria* beaten from lichen-covered yews, mostly from those which were isolated and unhealthy in appearance. Collecting at the end of May was on the whole very unpropitious and yielded very poor results. *Argynnis euphrosyne* was, however, on the wing in good numbers on the 26th in the Chiddingfold area.

I made another journey to the New Forest on June 1st. At night we had a good influx of *Drymonia trimacula* in the neighbourhood of Lyndhurst. On the 2nd, beating in Wilverley Enclosure produced several larvae of *Thecla quercus*, *Hylophila bicolorana* and one of *Lithosia quadra*. I once more visited the Folkestone district on June 8th to spend the Whitsun holiday. Mr. H. Lawson joined me again and we had quite a successful stay. At night on the Downs near Wye we took at light a great variety of insects, including *Mamestra genistae*, *Scoria dealbata*, etc. The next day was very fine and insects were in great profusion in the Ashford woods, especially *Argynnis euphrosyne*, *A. selene*, as well as *Hemaris fuciformis*, of which we took a good series flying over bugle. That night was equally productive in the same locality. We had the good fortune to take two fresh specimens of *Diptera orion* at sugar, while at light we recorded several *Smerinthus populi*, *Cerura bifida*, *Lithosia sororcula*, *Cidaria corylata*, *Pachys betularia*, etc. My next expedition, on the 15th, took me to the Fens and the Breck Sand. That evening in the neighbourhood of Mildenhall *Metopsilus porcellus* was flying freely at dusk, while later on that night in Wicken Fen, *Macrogaster castaneae* and *Meliana flammea* were the chief visitors to the sheet. On the following day I was fortunate enough to find *Lithostege griseata* fairly numerous in some of its local haunts. It was remarkable to note the resemblance of this insect to the small white stones on the barren ground from which it is usually flushed. *Emmelia trabealis* (*sulphuralis*) and *Acidalia rubiginata* were also quite common in the same area.

Weather conditions greatly improved during the latter half of June, which provided on the whole the best collecting period of the year. On the 25th Mr. Archibald Russell accompanied me on a visit to Tilgate Forest. A severe thunderstorm had taken place during the day, and the outlook was so threatening in the evening that we almost abandoned the outing. We were well rewarded for our efforts, as it turned out to be quite the best night's collecting of the season, and for variety of insects probably the most productive I have ever known. We were kept busy from dusk till dawn by a continuous stream of moths to the lights and recorded a total of sixty-three species. Among these we took twenty-four *Stauropus fagi*, including the dark form, which far exceeded my previous "bag" of sixteen in one night in the New Forest. We had the good fortune to secure a single example of *Acronycta alni* as well as several *A. leporina*, *Palimpsestis octogesima*, and quite a number of *P. fluctuosa*. The Prominents were well represented by *Pheosia tremula*, *P. dictaeoides*, *Drymonia trimacula*, *Notodonta dromedarius*, *Pterostoma palpina*, the Geometrae by *Boarmia roboraria*, some twenty *Pachys betularia*, several *Semiothisa notata*, *Cidaria fulvata*, and *Acidalia inornata*. Among the Noctuae there were any number of *Hapalotis fasciana*, a good many *Noctua primulae* and *N. brunnea*, *Mamestra pisi*, etc.

On the afternoon of June 29th, Mr. J. M. Craske and myself travelled northwards by train to the Lake District. We reached the Langdale Valley by 8 p.m., and decided to do some collecting in the vicinity of the Dungeon Ghyll Hotel. The night, which was fairly close, turned out to be one of the most amazing I have experienced for the numbers and variety of Lepidoptera which visited the sugar patches, each of which was smothered as soon as it was prepared. We soon had all our pill-boxes and killing bottles laden. Melanic forms of many species predominated. This was especially noticeable with *Xylophasia monoglypha*, *Hadena adusta* and *Apamea gemina*, all of which were in great plenty. Other species well represented included *Acronycta leporina*, *A. ligustri*, *Mamestra contigua* and *M. pisi*.

(To be continued.)

APLASTA ONONARIA IN KENT.—I should like to record the personal capture of a male of this insect on the Kent coast in August, 1932. The specimen was exhibited at the South London Meeting on November 10th the same year. Last year a second specimen was captured by a friend in the same spot also, I believe, in August.—A. W. HUGHES; "Delamere", Buckingham Way, Wallington, Surrey.

ACROPYGA (RHIZOMYRMA) ROBAE SP. NOV. (HYM FORMICIDAE), A NEW S. AMERICAN ANT, WITH REMARKS ON THE GENUS, ETC.

BY HORACE DONISTHORPE, F.Z.S., F.R.E.S., ETC.,
Department of Entomology, British Museum (Nat. Hist.).

Acropyga (Rhizomyrma) robae sp. n.

♀. Pale yellow, apex of mandibles and teeth reddish-brown eyes brown, whole body clothed with longer and shorter, erect o suberect, pale yellow hairs, extremely finely and closely punctured.

Head subrectangular, about as long as broad, sides feebly rounded posterior border slightly emarginate; *eyes* very small, consisting o about three facets, situated on the sides of the head about a quarte of the length of the head from anterior border; *mandibles* narrow curved, armed with three pointed teeth, the apical one being th longest; *clypeus* convex, rounded in front; *frontal area* distinct moderate, triangular; *frontal furrow* not present; *frontal carina* moderate, bisinuate; *antennae* 8-jointed; *scape* curved, not quite reaching the posterior corners of the head when bent back; *funiculus* increasing in breadth to apex, first two joints elongate, third and fourth transverse, fifth and sixth as long as broad, last joint pointed, as long as the three preceding taken together. *Thorax* robust, not quite as long as the head and mandible taken together; *pronotum* transverse, rounded at sides; *mesonotum* convex, higher thar pronotum, *suture* between distinct; *meso-epinotal suture* somewhat deep, well defined; *epinotum* convex round, sloping gradually to the *declivity*, which is longer than the dorsal region. *Petiole* short, furnished with a *node* which is pointed above, the anterior surface flat, the posterior surface slightly concave; *gaster* rather long and bulky, pointed at apex. *Legs* moderate, not very slender. *Long*, 2 mm.

♀. Pale yellow, apex of mandibles and teeth reddish-brown, eyes, ocelli and a spot at insertion of fore wing black. Larger, but with structure, etc., except the usual differences, much as in the ♀. The *mandibles* and *apical tooth* are longer; *eyes* and *ocelli* well formed; *wings* somewhat dusky, one *cubital cell*, no *discoidal cell*, *radial cell* closed. *Long*. 3.4 mm.

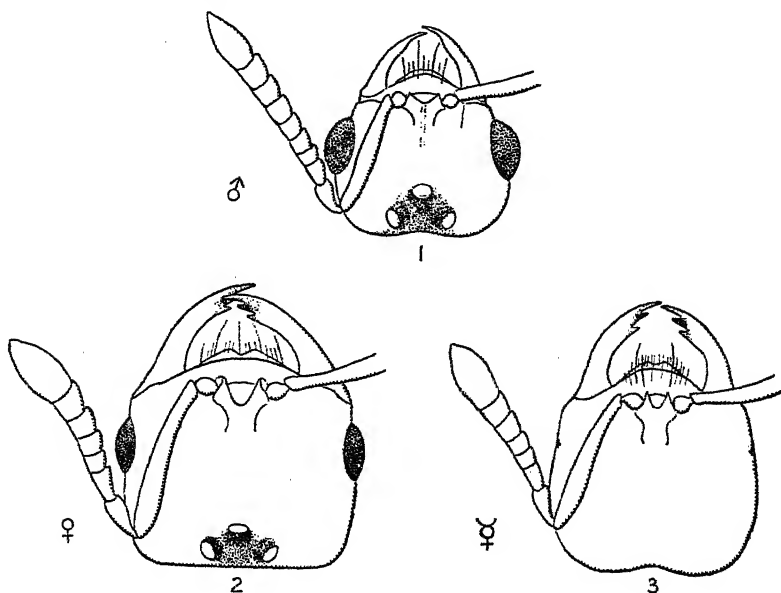
♂. Smaller than the ♀, dirty brownish yellow, head blackish. *Eyes* large; *ocelli* moderate; *mandibles* thin, curved, with an angulation near apex (but no teeth); *apical tooth* pointed; *antennae* 10-jointed; *node* of *petiole* rather large, rounded above, anterior and posterior surfaces flat. *Wings* as in ♀. *Long*. 2.3 mm.

Described from a number of workers, eight winged females and two males taken by M. René Paul Robá at the roots of coffee, associating with a small Coccid, at La Esperanza, Colombia, S. America, in April, 1935.

Holotype ♀, allotype ♂ and ♀ and paratypes in the British Museum (Nat. Hist.).

The genus *Acropyga* Roger is divided into four subgenera: (1) *Acropyga* s. str., (2) *Atopodon* Forel, (3) *Malacomyrma* Emery and (4) *Rhizomyrma* Forel. The first two of these occur in the Indo-Malay and Papua-Australia regions; the third, of which there is only one species known, has only been found in Eritrea; and *Rhizomyrma*, besides having a similar distribution to the first two, is also found in Central and South America.

All the species of the genus are very hypogaecic in their habits, living at the roots of plants, and keeping root-Coccids, which they help to disseminate.



Head of *Acropyga robae*:—Fig. 1, male; Fig. 2, female; Fig. 3, worker.

Some of the species have been proved to be injurious to cultivated plants on account of these habits. Dr. N. Annandale in India (as quoted by Prof. Silvestri in 1924) and Dr. G. H. Bünzli in Surinam (in a letter to Prof. Wheeler in 1932) have described how the female ants, when they leave the nests for the marriage flight, carry with them in their jaws a young female root-Coccid which they place on the roots of the plants where they found a new colony. Bünzli published, in 1935, a voluminous paper dealing with his observations and experiments in the coffee plantations at Surinam. There he studied two species of *Rhizomyrma*, and he shows that they cause considerable injury to the

coffee by transplanting root-coccids to new, healthy plants. These coccids not only suck the sap of the coffee roots, but also infect the plants with pathogenic organisms. As very many female ants are produced in the nests, which are often numerous in the coffee plantations, it will be seen how real a danger these ants may become.

The following is a list of all the known species of neotropical *Rhizomyrmæ*, showing the date of publication, localities, length, number of joints to the antennae, and teeth to the mandibles, in the workers, females and males :

Species.	Date of publication.	Patria.	Length (mm.).	Joints of antennae.	Teeth to mandibles.
Workers.					
1. <i>R. decedens</i> Mayr . . .	1887	Brazil	2-2.5	9-11	4
2. <i>R. göldii</i> Forel . . .	1893	"	2-2.3	9-11	4
3. <i>R. pachycera</i> Emery . . .	1905	"	2.2	9	4
4. <i>R. exsanguis</i> Wheeler . . .	1909	Mexico	1.4-1.6	8-9	3
5. <i>R. fuhrmanni</i> Forel . . .	1913	Colombia	1.7-1.9	8	4
6. <i>R. parvidens</i> Wheeler & Mann . . .	1914	Haiti	1.8-2	10	4
7. <i>R. marshalli</i> Crawley . . .	1921	Barbados	2	10-11	3
8. <i>R. wheeleri</i> Mann . . .	1922	Honduras	1.5	9	3
9. <i>R. pickeli</i> Borgmeier . . .	1927	Brazil ; Surinam	2-2.2	10-11	4
10. <i>R. bruchi</i> Santschi . . .	1929	Argentina	2	9	3
11. <i>R. paramaribensis</i> Borgmeier . . .	1933	Surinam	1.8	7-8	3-4
12. <i>R. rutgersi</i> Bünzli . . .	1935	"	2.4-3.2	9-11	3-4
13. <i>R. berwicki</i> Wheeler . . .	1935	Trinidad	1.5-1.8	8	4
14. <i>R. robæ</i> sp. nov. . . .	1936	Colombia	2	8	3
Females.					
1. <i>R. decedens</i> Mayr . . .	1887	Brazil	3-3.3	10	4
3. <i>R. pachycera</i> Emery . . .	1905	"	3.7	9	4
5. <i>R. fuhrmanni</i> Forel . . .	1913	Colombia	2.5-2.7	8	4
8. <i>R. wheeleri</i> Mann . . .	1922	Honduras	2	9	3
9. <i>R. pickeli</i> Borgmeier . . .	1927	Brazil ; Surinam	2.8	11	4
11. <i>R. paramaribensis</i> Borgmeier . . .	1933	Surinam	2.5	7-9	3
12. <i>R. rutgersi</i> Bünzli . . .	1935	"	3.6-4.8	10-11	3
14. <i>R. robæ</i> sp. nov. . . .	1936	Colombia	3.4	8	3
15. <i>R. smithi</i> Forel . . .	1893	St. Vincent	2.1	7	4
Males.					
1. <i>R. decedens</i> Mayr . . .	1887	Brazil	2	11	" Deut- lichen Zähne "
9. <i>R. pickeli</i> Borgmeier . . .	1927	" Surinam	1.3-1.6	9	..
11. <i>R. paramaribensis</i> Borgmeier . . .	1933	"	2.2	10	3-4
12. <i>R. rutgersi</i> Bünzli . . .	1935	"	2.8-3	12	3
14. <i>R. robæ</i> sp. nov. . . .	1936	Colombia	2.3	10	1
16. <i>R. dubita</i> Wheeler & Mann . . .	1914	Haiti	2	12	3

LITERATURE.

I have actually looked up all the publications on the different species and their bionomics, but they are too numerous to list here. References to nearly all of them, however, will be found in the papers quoted below.

BÜNZLI, G. H.—"Untersuchungen über coccidophile Ameisen aus den Kaffeefeldern von Surinam," 1935, *Mitt. Schweiz. Ent. Ges.*, 16 : 455-593.

EMERY, C.—1925, *Genera Insectorum* : Formicinae, fasc. 183 : 27-31.

SILVESTRI, F.—"A New Myrmecophilous Genus of Coccidae from India," 1924, *Rec. Indian Mus.*, 26 : 311-315.

WHEELER, W. M.—"Ants of the Genus *Acropyga* Roger, with Description of a New Species," 1935, *Journ. New York Ent. Soc.*, 43 : 321-329.

WICKEN FEN FUND.—This fund is raised annually by entomologists and other nature-lovers to assist in defraying the expenses incurred by the custodians of Wicken Fen, the National Trust, in administering the Fen, preserving the fauna and flora, and in providing a watcher. The Fen is unfortunately very inadequately endowed, and its maintenance places a severe strain on the resources of the custodians, who for many years have had to contribute a considerable sum of money annually towards its upkeep. Of late, owing to the lack of funds for cutting, etc., the reed has greatly increased its growth, to the detriment of other plants, and, therefore, the fauna dependent upon them. In consequence of the representations and actions of certain entomologists who are members of the Committee of Management, supported as they have been by the Royal Entomological Society of London, an effort is being made to remedy this by cutting the reed during the summer, thereby weakening its growth, and ultimately eliminating some of it, but of course the extent to which this can be done depends entirely upon the amount of money available. It is earnestly hoped, therefore, that every nature-lover who possibly can will contribute towards this very desirable object, and will send his or her contribution as soon as possible to the Hon. Treasurer, W. G. SHELDON, West Watch, Oxted, Surrey, who will be pleased to send permits for observation or collecting to subscribers on application. The amount subscribed in 1935 was £120 17s. 6d.

GONEPTERYX RHAMNI : NOTE ON THE LARVAE.—The question raised by Mr. Burkill on the position taken up by the larvae of *G. rhamni* is interesting. But I have found, except when first hatched, or a day or so old, that with very few exceptions they lie on the upperside either along the midrib or against one of the other ribs when young, and invariably along the midrib when older. I am speaking of only when in a wild state. I have always found the quite young larvae are easy to find by examining the young shoots that are eaten, and nearly always not more than about 5 ft. from the ground.—F. W. FROHAWK ; April, 1936.

A NEW SPECIES OF DANAIDAE (LEP. RHOP.) AND
OTHER NEW BUTTERFLIES.

BY G. TALBOT, F.R.E.S.

(Plate III.)

Danaus dannatti sp. nov.

Allied to *D. phyle* Feld., and distinguished by the hyaline areas being greenish-yellow and the ground-colour dark chestnut. Distal area of both wings blackish brown.

♂.—Upperside of fore wing with the subapical band broader than in *phyle*, but similarly shaped. Submarginal spots as large as in some *phyle*, and antimarginal dots obsolete. In cellule 2 are two discal patches which are posteriorly connected in the single ♂ example, but which are probably usually separated into rounded patches. Cell-stripe as in *phyle*, but narrower. Submedian stripe narrower than in *phyle*, and almost divided by a line of ground-colour. Hind-wing markings similar to *phyle*. No discal spots in 3, 4 and 6. A series of six submarginal spots, much larger than in *phyle*, the three posterior ones in 2 and 3 smaller than the others in 4–6; the spot in 4 is placed a little distad of the others, and below the last spot is an indistinct dot. The sex brand extends over vein 2 as in *phyle*, but does not do so in other species of *Danaus* usually referred to the subgenus *Chittira*. Fringes of both wings blackish-brown, and marked with two bars of pale yellow between the veins.

Underside pale earth-brown, the chestnut colour only marked strongly over the costal and distal area of fore wing. Markings on the frons, palpi and legs buff-yellow, abdomen buff on ventral side.

♀.—Resembles the ♂. Upperside of fore wing with cell-stripe, submedian stripe and small discal spot at base of cellule 2 all obsolete. Hind-wing markings and underside as in the ♂.

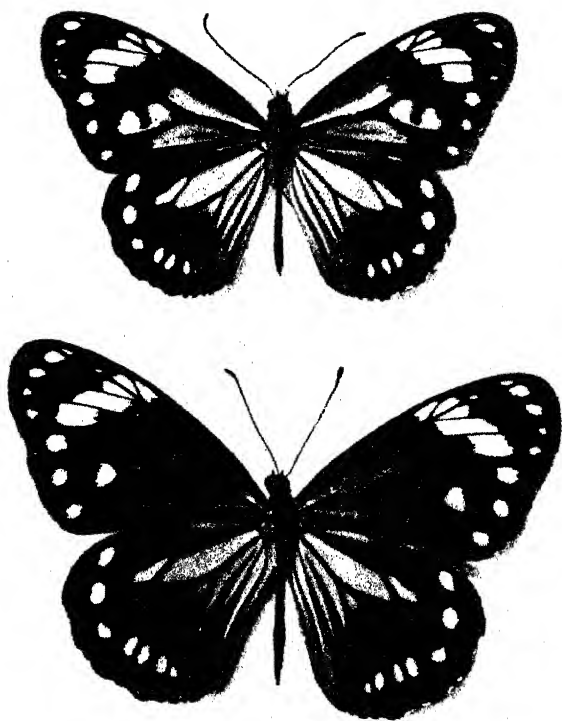
Expanse: ♂, 79 mm.; ♀, 94 mm. Length of fore wing: ♂, 42 mm.; ♀, 48 mm.

Habitat.—Philippines, without more precise locality, but possibly Mindanao.

A single male and female, described from the collection of W. Dannatt, F.R.E.S., to whom we have pleasure in dedicating this striking species. Mr. Dannatt has presented the type to the British Museum.

Pyrameis dejeani Godt. ssp. *mounseyi* nov.

The distribution of this species is peculiar. The typical form occurs in Java, and in Lombok is found the race *sambulana* Fruhst. It is now recorded from the Philippines, this fact being brought to our notice by Mr. W. Dannatt, in whose collection exists the single male specimen. A female was found in the Oberthür Collection at the British Museum.



John Bale, Scam & Lemsley, 112, London

DANAUS DANNATTI sp. nov.

♂.—Upperside with the ground-colour much darker than in the two other races. Fore wing with no discal spot on vein 3, and only an obscure dot above this vein. The spot near the tornus is small and darkened; all other spots are pure white and sharply defined. Hind wing with reduced yellow-brown border to the submarginal spots, which are a little smaller than in the Java race. The five post-discal spots are a little larger than in the Java race, and less sharply defined.

Underside ground-colour as in the typical form. Fore wing with white discal band which is broken as above, but with a small spot in base of area 3, and with a slight projection from the lower part of band. The waved line in the cell is entirely thin, white, and without any yellow colouring. Hind wing with broader pale costal patch. The eye-spots in 2 and 5 are larger.

♀.—Resembles the ♂. Ground-colour only slightly darker than in the typical form, and on the hind wing the yellow-brown area is not reduced. Underside as in the ♂.

Habitat.—Philippine Islands: ? Mindanao, 1 ♂ (J. J. Mounsey); Mindanao (J. Waterstradt, 1903–1904, ex Oberthür), 1 ♀ (holotype), in the British Museum.

I have much pleasure in dedicating this distinct race to Mr. Mounsey, whose collections from the Philippines have added much to our knowledge of those islands.

Papilio antimachus ssp. (*vel forma*) *coffea* nov.

No geographical race of *antimachus* has so far been distinguished among the multitude of specimens existing in museums. The species has a fair range of variability, and several names have been applied to individual forms. Whether the form here described represents a race is, perhaps, not positively certain. It may represent the result of a single brood, or be a particular strain limited to a small area, in which case it is an individual local form occurring with typical examples.

This form comes from the Ivory Coast. It was in a collection made by Monsieur Melou and acquired by the late Charles Oberthür. The specimens since passed to Mr. John Levick, of Birmingham, in whose collection they remain.

The species has not been recorded previously from the Ivory Coast, although it occurs in Sierra Leone.

♂.—Upperside of fore wing without a distinguishing character. Hind wing with the basal costal bar not so dark as a rounded black spot placed at its end near the base of vein 7.

Underside a warm coffee-brown colour on both wings, only excepting the more typical yellow-brown on the fore wing of the basal half of cell, inner marginal streak, and of the two distal curved patches in 2 and 3; the black ground-colour appears in the usual

places. The middle cell-patch and the post-cellular ones below vein 4 are much darker brown. Hind wing darker brown than the fore wing. Only slight black edging to the praecostal vein and to the sides of the praecostal cell. The brown stripes on each side of the veins reach almost to the margin. The marginal spots are similarly brown.

Habitat.—Ivory Coast: Bingerville, xi.1913, 4 ♂♂ (Gaston Melou). Type in the Levick Collection.

British Museum (Natural History),
London, S.W. 7.

A WEEK'S COLLECTING NEAR STARCROSS.—The period August 10th to August 17th was spent on the Dawlish side of Starcross. *Callimorpha hera* was commonly seen flying in the sunshine, and on dull days could be found at rest or beaten out of hedges. *Bryophila muralis* was not uncommon on walls. In the leafy lanes inland *Ephyra porata* was found commonly and in good condition, but *Anticlea rubidata* was rather worn. A single *Cidaria picata* was encountered and one *Hyphenodes taenialis*. *Acidalia imitaria* was not uncommon. On the heaths further inland *Pachycnemis hippocastanaria* and *Agrotis strigula* were plentiful and in good condition. Sugared posts on the coast proved a failure, but a few *Caradrina ambigua* were netted after dusk. Other species met with were *Crocallis elingvaria*, *Lithosia griseola*, *Miana literosa*, *Gnophos obscurata*, *Sarothripa revayana*, *Rivula sericealis*, *Eupithecia subfulvata* and *Cosmotriche potatoria*.—HAROLD KING, D.Sc., F.R.S.; 28, Hawthorne Avenue, Harrow.

EUPISTA (COLEOPHORA) SYLVATICELLA WOOD, AND LITHOCOLLETIS DISTENTELLA ZELL., IN EAST KENT.—On June 4th and 6th, 1935, I took a single male of the former and four females of the latter species in Blean Woods—a very interesting extension of their range. Mr. H. Stringer informs me that there is in the B.M. no labelled material of either species from any British locality except Tarrington, Herefordshire, taken by the late Dr. Wood, nor can any of my friends give any further information. It would be interesting to know if anyone has taken them in Kent or any other intervening county. The Eupistas were flying round their food-plant in the afternoon sun, and I have checked the determination by cleaning and mounting an abdomen and comparing it with the figure in Mr. F. N. Pierce's and the Rev. J. W. Metcalfe's new book, *The Genitalia of the Tineina*. The hanging lobes on either side of the ostium are unique in the British members of the genus and make the species easily identifiable, and the other characters exactly resemble the figure. My friend Mr. W. Mansbridge suggests that *L. distentella* may, like *L. amyotella* Dup., be a tree-top species and therefore overlooked. He is probably correct, as it was taken after a morning of rain and strong wind, flying in early afternoon sunshine in the lee of a dense and tall thicket of Hornbeam.—H. W. DALTRY; Bar Hill, Madeley, Crewe.

NOTES ON BRACONIDAE: XV.—MICROGASTERINAE.

BY CLAUDE MORLEY, F.R.E.S., F.G.S., F.Z.S.

(Continued from p. 94.)

12. *A. limbatus*, Msh.—I have seen none bred. Captured at Shere in Surrey (Capron); on an upstairs window of Monks Soham House, Suffolk, at 8.30 a.m. on August 12th, 1907, and a metatype at Ipswich in 1893.

13. *A. affinis*, Nees.—NEW to Britain. Three ♂ and 1 cocoon, with the shrivelled larva of *Cymatophora duplaris*, whence they had been bred in the New Forest, Hants, during June, 1906 (Dr. K. G. Blair). I swept a female from roadside herbage at Tuddenham village in Suffolk on June 12th, 1908.

14. *A. rubripes*, Hal.—Two bred on June 9th, 1927, from "pupae" of *Pieris brassicae* found on posts in Aberdeenshire on September 26th preceding (Graham-Smith). One and bundle of cocoons, with shrivelled larva of *Geometra papilionaria*, whence they were bred at Liverpool on June 30th, 1909 (W. Mansbridge). Captured at Market Rasen in Lincs on June 11th, 1912 (cf. *Trans. Ent. Soc.*, 1885, p. 175; *Ent. Record*, 1905, p. 227).

15. *A. rubecula*, Msh.—Said to attack young larvae of *Pieris rapae* in England. I do not know the species.

16. *A. glomeratus*, Linn.—Larvae, cocoons and imagines are figured by Albin in 1720, pl. i, fig. 1 h. et g.; cf. *Ent. Record*, 1909, p. 261; *Entom.*, 16: 263; 1908, p. 249; 1922, p. 245. Sixteen and 2 bundles of cocoons bred from *Pieris brassicae* at Cheltenham in July, 1925 (Mott). I have bred from a similar bundle of cocoons found on September 19th, 1910, *ex* the same host at Southwold in Suffolk, 2 hyperparasitic Chalcids of the genus *Pteromalus*, which emerged on May 30th following. Besides Pierids, this species is supposed to be the enemy *par excellence* of the Currant Moth; but I have never bred it thence. On July 12th, 1915, Porritt sent me a bundle of 11 cocoons and the resultant 11 live imagines, remarking that "out of the very many thousands of *A. grossulariata* larvae I have bred in Yorks during the last seven or eight years, I have never bred this parasite before. And this year, out of considerably more than three thousand wild larvae of the moth that I have collected, there were only this batch and one other of about the same size".

18. *A. sericeus*, Nees.—Apparently rare; captured in the Haven Street woods, Isle of Wight, on June 28th, 1907, and on Clare Island, co. Mayo, in early July, 1910. "Bred by Bignell from *Drepana lacertinaria*, L., in Devon. Two ♀♀ bred at Stornoway from *Melanippe hastata*, L." (Marshall's MS.).

19. *A. geryonis*, Msh.—Four and 7 cocoons bred from *Platyptilia*

rhododactyla, Fab., in England (probably by Tutt). Taken in Bentley Woods, Suffolk, on May 27th, 1900.

20. *A. zygænarum*, Msh.—One bred from unknown host on *Linaria vulgaris* at Limber in Lincs, August, 1913 (S. W. Mason). 3 from a cocoon of *Zygaena filipendulæ* at Bristol (Charbonnier); 8 from a larva of that moth in Isle of Wight, July, 1910 (Slater); a dozen and some 50 cocoons with the two dry larvae of the same moth, whence they had emerged at Southend on July 12th, 1900 (Whittle); Felixstow, Suffolk (Platten). [On October 31st, 1899, I examined 105 cocoons of *Z. filipendulæ* on the Felixstow cliffs; no more than a solitary example had been parasitized, and that by a *Spilocryptus*.] “*A. zygænarum* has been bred from *Lycaena icarus*, Rott., by Bignell; and from *Melitæa aurinia*, Rott., by Billups” (Marshall’s MS.). Captured at Brandon in Suffolk on June 5th, 1903.

21. *A. spurius*, Wsm.—Five and 9 cocoons bred from larvae of *Elachista adscitella*, Stn., at Hasleden Dene in Durham on July 1st–4th, 1895 (E. R. Bankes); 53 and a bundle of cocoons on a grass-stem, whence they were bred at Lyndhurst, New Forest, during 1924 (Miss Ethel Chawner). Captured at Ipswich in Suffolk (Platten) and Guy’s Head in the Lincolnshire fens, on August 18th, 1906. “In the case of a solitary specimen bred by Bignell from *Vanessa urticae*, there was no exterior envelope of the cocoon” (Marshall’s MS.).

22. *A. cleoceridis*, Msh.—Two, bred from unknown host, at Hyères in Var, France, April, 1904 (Dr. T. A. Chapman). A dozen captured at Shere in Surrey (Capron).

23. *A. jucundus*, Msh.—Unknown to me. “Bred by Bignell from a cocoon found on oak in Devon. Two ♂♂ in Billups’ collection, bred in Ireland from *Pieris brassicae*” (Marshall’s MS.).

24. *A. caje*, Bouché.—An immature ♀ from *Arctia caje* at Douna Nook in Lincs, where “every larva was full of this parasite”, on June 20th, 1906 (Mason); 4 bred in 1924 from the same species of larva at Bournemouth in Hants, April, 1923 (Clutterbuck). About 156, with many of their separate cocoons adhering to the hair-tips of a single *A. caje* larva, bred in London during July, 1905 (Chapman); 9 and 6 cocoons bred from *Eriogaster arbusculæ* (the high Alpine form of *lanestris*) at Lauteret in Dauphiny during 1905, and 200 in 1906, when 99% of these larvae were destroyed by a small Tachinid-fly while young and by the *Apanteles* while old (Chapman). Never captured by me.

25. *A. juniperatae*, Bouché.—Nine and 4 cocoons on leaves, bred in October, 1904, from *Acrolepia pygmaeana*, Haw., whose larvae were collected near Dartmouth on September 13th, 1904 (Bankes); with these Braconids emerged a single Ichneumon,

Sagaritis maculipes, Tsch., ♀, probably hyperparasitic upon them.

26. *A. difficilis*, Nees.—Twenty-three and 28 cocoons bred in May and June, 1900, from larva of *Amphydasis betularia* found in garden at Methley, near Leeds, Yorks, in October, 1899 (Wigin); 8, and as many pink cocoons, bred on August 20th, 1925, from larvae of *Bombyx rubi* that were taken at Dunwich, Suffolk, in October, 1924 (Dr. C. H. S. Vinter); and at Tostock there from *Xylocampa lithorhiza* (W. H. Tuck). Several beaten from spruce-fir at Elveden, Suffolk, on May 3rd-4th, 1907.

28. *A. placidus*, Hal.—A single ♀ of this species emerged on October 12th, 1899, from one among the above 28 cocoons of *A. difficilis* bred at Methley from *A. betularia*, suggesting synonymy. The cocoon of another solitary ♀ emerged from a larva of *Eupithecia castigata*, at the time of the latter's spinning-up, at Newcastle on May 3rd, 1901 (Nicholson). Not captured on the wing by me. There is some error of host about Peter Cameron's "Note on *A. placidus*, Hal." in *Ent. Mo. Mag.*, 1874, p. 211.

29. *A. nothus*, Msh.—Five and 5 interwoven cocoons bred from *Anticlea sinuata* at Tuddenham in west Suffolk in June, 1899 (Rothschild); 1 and 2 cocoons on grass-stems bred in July, 1904, from *Stenoptilia zophodactyla*, Dup., from Isle of Purbeck in Dorset (Bankes); 12 and 11 individual cocoons with shrivelled larva of *Amphydasis betularia*, bred by G. Nicholson at Kew in 1907 (Sich).

31. *A. punctiger*, Wsm.—One ♀ was bred from *Lithocolletis messaniella*, Zell., on Ilex leaves in the Isle of Man during July, 1905 (Dr. R. T. Cassel). A ♂ was captured on the wing at Dalkey, near Dublin, by me on July 2nd, 1913.

32. *A. adjunctus*, Nees.—I have seen none bred. Captured at Rookley Wilderness in Isle of Wight during August, 1907 (Frank Morey); a dozen at Greenings in Surrey (W. Saunders); Finacan in Yorks in August, and Brandon in Suffolk in June, 1910 (E. A. Elliott); Monks Soham fly-trap in the same county in July, 1915, and West Leake in Notts.

33-4. *A. lictorius* and *scabriculus*, Reinh., I do not know. The latter does not seem yet recorded as British with any degree of certainty.

35. *A. falcatus*, Nees.—I have none bred. Commonly swept from herbage at Birnam in Perth, August 20th, 1907 (Elliott), and at Felden in Herts (Albert Piffard); frequent on Angelica flowers at Barnby, Henham, and in my Monks Soham garden, Suffolk, always in August.

36. *A. hoplites*, Ratz.—I captured a single ♀ flying on Brandon Heath in Suffolk on August 29th, 1929; I will not name a probable *Gelechia*-host in so heathy a locality. Its sole known hosts are

G. pinguinella, Tr., which is not recorded from Suffolk, and *G. (Anacamptis) populella*, Clk., whence "it was bred by Bridgman" (Marshall's MS.; recte *Trans. Ent. Soc.*, 1933, p. 178).

37. *A. cultrator*, Msh.—Eleven and 3 dry larvae, a dozen interwoven cocoons and a shrivelled larva of *Melitaea athalia* were sent on May 2nd and August 18th, 1900, respectively, bred from that butterfly at Locarno (Chapman). Captured at Braemar, N.B., on September 5th, 1909 (Elliott); and Crawley in Sussex during 1902 (E. A. Newbery).

38. *A. decorus*, Hal.—One ♀ and its cocoon on a pinnula, bred from an unspecified Lepidopterous larva feeding on spruce-fir at Corfe Castle in Dorset on June 25th, 1901 (Bankes). Captured in Suffolk at Benacre Broad on August 25th, 1900 (W. H. Tuck), on fir-trees at Barton Mills on June 5th, 1916 (Elliott), flying in Bentley Woods on May 5th, 1899, and swept in Henstead marsh on July 3rd, 1836.

39. *A. ulior*, Reinh.—One ♀ and 5 cocoons were bred from a larva of *Notodonta ziczac* at Haslemere in Surrey on September 28th, 1899 (R. M. Prideaux); 9 raised from *Anticlea cucullata*, Hfn., i. e. *sinuata*, Hb., in South Devon during 1901 (Bankes). 13 and 20 cocoons bred from one larva of *Melitaea cinxia* at over 7000 ft. at Lauteret in Dauphiny during June, 1914 (Chapman). Not found wild by me.

40. *A. dilectus*, Hal.—A ♀ and a dozen interwoven cocoons on leaf, with the desiccated half-grown larva of *Notodonta dromedarius*, whence they emerged in Epping Forest, Essex, during August, 1905 (Dr. K. G. Blair). Captured at Devonport in Devon during May, 1895 (Philip DelaGarde).

41. *A. suevus*, Reinh.—This I do not possess, nor is it certainly British.

42. *A. contaminatus*, Hal.—Five imagines and 7 separate cocoons bred from *Nola cuculatella*, L., at Lee in Kent during 1897 (Bankes); 26 and 4 cocoons on a leaf with 3 dry larvae of *Pselnophorus brachydactylus*, Staud. Cat. no. 1372, whence they were raised at Lausanne in July, 1905; also 22 and 25 separate cocoons with 3 similar larvae of that Plume, whence they were bred there in June, 1905 (Chapman). "Two ♀♀ bred from *Lithocolletis vacciniella* at Rannoch by Adkin" (Marshall's MS.). Captured at Greenings in Surrey during June, 1871 (W. Saunders).

43. *A. xanthostigmus*, Hal.—A ♂ bred from *Ornix betulae* at Chiswick on July 17th, 1910 (Sich). A ♀ bred on May 18th, 1900, from *Lithocolletis alnifoliella*, collected at Wilton near Salisbury on November 8th, 1899 (Bankes). Several and one cocoon bred at Devonport in Devon in May, 1895 (DelaGarde). Captured at Greenings, June, 1871 (Saunders), and at Shere (Capron) in Surrey; Felden in Herts (Piffard).

44. *A. exilis*, Hal.—I have captured both sexes rarely, at Killiny, near Dublin, on July 2nd, 1913, and on reeds at Easton Broad, Suffolk, early in September, 1907.

45. *A. butalidis*, Msh.—A couple of ♀♀ and 3 separated cocoons were raised from *Butalis senescens*, Stn., at Swanage in Dorset on May 10th, 1896 (Bankes).

46. *A. longipalpis*, Reinh.—New to Britain. A single ♀ in my collection was captured in the neighbourhood of Shere in Surrey about 1889 (Dr. Edward Capron).

49. *A. praetor*, Msh.—One ♀ bred from unknown Lepidopterous host feeding on oak in Isle of Purbeck in Dorset, *n.d.* (Bankes). Captured not uncommonly at Shere in Surrey (Capron), Felden in Herts (Piffard) and at Shalfleet in Isle of Wight on June 26th, 1907.

50. *A. emarginatus*, Nees.—Taken on the wing at Greenings in Surrey during June, 1871 (Wilson Saunders), and at Merston in Isle of Wight on June 23rd, 1907.

51. *A. namus*, Reinh.—“Two ♀♀ bred from *Lithocolletis lantanella*, Schr., by Billups” in Britain and probably the London district (Marshall's MS.). I have a single Surrey ♀ in Capron's collection.

(To be continued.)

NOTES AND OBSERVATIONS.

SECOND BROOD OF *ERYNNIS TAGES*.—Mr. A. E. Wright's note (*Entom.*, 69 : 94) is interesting as it shows there is a tendency for a second emergence of this species during warm summers, even as far north as the northern border of Lancashire. In 1933 there were four notices of the second brood of *E. tages* (*Entom.*, 66). In that warm year I took four on August 13th at Swanage, Dorset, when I noticed the much lighter and more variegated appearance, especially the pale ochreous-cream colour of the underside of the specimens of the second brood. In 1921 I also took a second brood of this species in August in exactly the same spot.—F. W. FROHAWK; April 6th, 1936.

TRICHOPTERA IN THE AUSTRIAN TYROL.—During the summer of 1933, Mr. O. W. Richards, whilst on a holiday in the Austrian Tyrol, collected a few Trichoptera for the British Museum. Some of the species are of much interest, and amongst them is a small series of *Drusus melanchactes*, which is new to the museum collections. This species is one of the black forms of *Drusus*, which occur only at very high altitudes. I have taken *D. melanchactes* in the Upper Engadine, Switzerland, at the head of the Julier Pass, 7500 ft., and McLachlan records it at various other localities in Switzerland. Eaton took the species at Seefeld in the Tyrol. Mr. Richards's

examples were taken at 8000 ft. All the examples in the following list are labelled "Austria, Paznauntal, Galtür", between July 9th and 27th, 1933, at varying altitudes up to 8000 ft. The species obtained were: *Asynarchus coenosus* Curt., *Drusus discolor* Ramb., *D. chrysotus* Ramb., *D. melanchaetes* McL., *Cryptothryx nebulicolu* McL., *Potamorites biguttatus* Pict., *Philopotamus ludificatus* McL.—MARTIN E. MOSELEY; British Museum (Nat. Hist.), December, 1933.

THE NASH COLLECTION.—On February 11th last the collection of British Macro-Lepidoptera formed by the late Dr. W. Gifford Nash, of Bedford, came up for sale at Stevens's. The late Dr. Nash was particularly interested in the Lycaenids, the collection containing very long series of the "Blues", especially *Lysandra coridon*. Dr. Nash was a very keen field worker up to a few years ago, when failing health compelled him to give up active collecting to a large extent.

The sale started very badly, a long series of *Argynnis aglaia* and *Argynnis cydippe* (*adippe*) going for 3s. The next lot, however, put a very different complexion on things, when a very fine gynandrous *Argynnis paphia*, left side typical ♂, the right side ♀ var. *valezina*, was put up; after keen bidding this specimen realized no less than £24—one of the highest prices ever given for a single butterfly at Stevens's. A fine and perfect variety of *Limenitis camilla* (*sibylla*) intermediate between the type and var. *nigrina* was cheap at £2 10s. Very large numbers of *Colias croceus* (*edusa*) have been bred in the last few years, so £1 was a good price to give for a series of 48 more or less typical examples. Two ab. *chrysothemiformis* were not dear at £1; a nice series of 14 ab. *helice* realized £1 17s. 6d. Two nice dark *Melitaea cinxia* were cheap at £1 10s.; another beautiful example of this species with broad white bands on the underside was not dear at £3 10s.—an uncommon form. *Nymphalis poly-chloros* is a species which is not given to much in the way of variation in Britain; a pale yellowish example fetched £1 10s.; another with the spots reduced in size went for its full value at £1. An exceptionally dark ♀ *Maniola tithonus* together with a reddish ♂, both rather poor specimens, were worth in the writer's opinion more than the 5s. they realized. One of the gems of the collection was an extraordinary *Aphantopus hyperanthus* with large lanceolate spots on the upperside of the wings; this specimen was not as fresh as it might have been, but it was well worth the £9 it was sold at. A series of 16 ab. *arete* were not too dear at £1; another series of 29 specimens, mostly Scotch examples, realized £1 6s. A very fine lot of 19 *Coenonympha tullia* (*davus*) from Shropshire fetched a good price at £3 5s., another lot of 38 specimens also from Shropshire were cheap at £2 5s. These Shropshire examples are getting scarcer every year, as on the particular moors on which they are found the peat is being extensively cut; it is only a question of time before they meet with the fate of the Delamere race. A fair ♀ specimen of

Lycaena dispar was not too dear at £3; the other 3 specimens in the collection were very poor; the £2 2s. they realized was all they were worth. *Coenonympha pamphilus* is probably more neglected by collectors than any other British butterfly, but anyone who does give some attention to *pamphilus* is sure to get sooner or later one or two cream-coloured forms like the specimen in this collection, which is a fine fresh ♂ taken at Royston; it realized £5 15s. The writer refrains from comment! A rare form of *Strymon w-album* without the usual red band on the hind wings was a bargain at £1 8s. Four nice varieties of *Aricia agestis* were cheap enough at £1 2s. 6d.; so were long series of var. *urtaxerxes* of this species at 16s. and 18s. A fine striated ♂ *Polygonomatus icarus* having the ground-colour exceptionally white realized £6 10s.—a fair price; another ♀ example with heavy striations on the fore wings went for its full value at £4; a short series of 9 very dwarf *icarus* realized £1 4s. A particularly interesting ♂ *Lysandra bellargus* intermediate between the type and var. *czekelii* was a bargain at £3 5s.; a typical var. *czekelii*, a rather rare grey form of *bellargus*, went for a very high figure at £3 5s. This collection contained a long series of *Maculinea arion* mostly in good condition which were put up in six lots; they went at prices ranging from £1 to £3 a lot, the latter figure being given for a dozen fine specimens; 5s. each for *arion* is a stiff price; it is much to be regretted for the sake of this species they can command such a figure. *Lysandra coridon* with its numerous varieties is probably the most popular and sought-after butterfly in the British list. This collection contained an enormous number of examples; included amongst them were some striking varieties. A long series of more or less typical ♂♂ were given away for 5s.; another lot of 31 ♂♂ containing 2 ab. *fowleri* and some good colour forms fetched a fair price at £1 2s. Occasionally a dull leaden-coloured form of the ♂ is found; several of these were taken at Royston in 1922, the summer following the very hot year of 1921. One lot of 3 specimens realized £1 4s., and another lot of 4, £1 6s.—a low price for this rare variety. A rather poor specimen of the very rare so-called "black" variety was a bargain at £1 6s. Lot 122, consisting of 21 specimens of ab. *minor*, was a gift to the buyer at 5s.; the next two lots put together, containing a good many interesting minor varieties, were cheap enough at 18s. Two moderately well striated ♂♂ realized their full value at £3; a better example with a very white ground-colour was not dear at £1 4s.; a fine white ♂ ab. *corydonis* in perfect condition went for a good figure at £4. Three lots of ab. *semisyngrapha*, 48 specimens in each lot, went at £1 8s. a lot; an interesting series of 47 ♂♂ were not dear at £1; a fine ♀ heavily striated on one fore wing and less so on the other wings was cheap enough at £2. A fine cream-coloured ♀ near ab. *corydonis* was not too dear at £2 5s.; another rather poor ♀ ab. *corydonis* realized rather more than its value at £4 5s. An exceptionally dark and perfect ♀ ab. *corydonis* realized £3 10s.; another of these obsolete forms, not too good a specimen, was bought for £2, a very rare form of the ♀

antico-obsolata with brown rayed hind wings was probably the bargain of the sale at £1; another ♀ with a very broad band in the fore wings was cheap enough at 18s.; 22 ab. *roystonensis* were a gift to the buyer at 9s. The fine series of ab. *syngrapha* put up in six lots of 5 specimens in each went at prices ranging from £1 12s. 6d. to £2 5s. a lot—their full value; 4 examples of the ♀ having the hind wings of a dull purple shade were interesting; these were not dear at £1 15s.; another lot of 3 examples of the same form realized £1 12s. 6d. Two fine gynandromorphic ♀♀ were a bargain at £3; another more extreme example also realized £3. A very fine ♀ ab. *fowleri* was well worth the £2 2s. it fetched. A nice melanic variety of *Aglaia urticae* was cheap at 12s.

The moths in this collection with a few exceptions do not call for much comment. £1 8s. was a high price to give for Lot 183, consisting of 4 *Acherontia atropos* and 4 *Herse convolvuli*; the next lot, also consisting of 4 *atropos* and 3 *convolvuli*, went to the other extreme at 10s. A lot of 4 fine typical *Sphinx pinastri* went for £1 8s.; another lot of 5 specimens of this hawk moth were cheap at 18s.; a very fine melanic specimen of *Sphinx pinastri*, taken by Dr. Nash on July 27th, 1931, realized a very high figure at £12—in the writer's opinion a good deal more than it was worth. A *Celerio gali* together with a *Celerio livornica* was a bargain at 12s.; a fine ♀ *Celerio livornica*, taken by Dr. Nash in the Isle of Wight in 1931, fetched a very good price at £2; another good ♀ went for the same figure; a fairly good specimen was sold at £1 8s. *Livornica*, a fine handsome hawk-moth, is not really a rarity; a friend of the writer's used to take it in his garden at Torquay almost every year. Amongst the Zygaenids, half-a-dozen fair specimens of *Zygaena achillae* went for 18s. Confluent examples of *Zygaena trifolii* are common enough; 3 very extreme confluent examples in this collection realized an average price of £3 10s. each—a great deal more, in the writer's opinion, than they were worth. A fine *Utchesia pulchella* taken by Dr. Nash at Bedford on May 29th, 1924, and interesting principally for its locality, most British *pulchella* having been taken in or near the coast, realized a very high price at £4—more than twice as much as examples of this species normally fetch at sales. A fine black-banded *Pseudopanthera macularia* was not dear at £1 15s., considering how rare aberrations are of this common geometer. Two fairly good specimens of *Rhodometra sacraria* realized £1 2s.—quite a good figure. Lot 243, containing amongst other good Noctuae a series of *Mellinia ocellaris* and *Dianthoecia barretti*, was not dear at £1 15s.

A few cabinets were included in this sale. A 36-drawer mahogany cabinet with exceptionally deep drawers at £6 6s.; a nice 15-drawer Gurney cabinet was bought for £9; a 20-drawer mahogany cabinet by Crockett fetched its full value at £18 10s., another Crockett cabinet with smaller drawers realized £15; a good 40-drawer mahogany cabinet with large drawers was a bargain at £13 10s. Two other light oak 40-drawer cabinets were bought at £6 each.

The prices realized at this sale, especially for the moths, on the

whole were very high. The sale was well attended and the bidding keen. Once again, from the vendor's point of view, the sale was well catalogued.—W. R.-S.

RECENT LITERATURE.

A Catalogue of the Macrolepidoptera of Ireland. By C. DONOVAN, Lt.-Col., I.M.S. (ret.). Printed for private circulation. Pp. 100. Price 5s. 6d.

It is over forty years since Kane's catalogue of the Lepidoptera of Ireland started in the *Entomologist* for March, 1893. Col. Donovan is to be congratulated on having brought all the records up to date, and his list will be welcomed by all students of Irish Lepidoptera.

He criticizes rather severely some of the records of Birchall and Dillon, but has been well advised to insert them in brackets. It may be that some of them will be proved correct when Ireland comes to be more intensively worked. He is rather caustic about the yellow *Pieris napi* and suggests that they are artificially coloured, but Main has shown (*Entom.*, 68 : 176) that the genuine ones do not react to boric acid and sodium benzoate like typical specimens which have been stained with picric acid, etc.; and Shepherd (*Entom.*, 69 : 61) has more recently given a very full statement of his breeding results with the Donegal strain, clearly demonstrating that the aberration is quite natural. Perhaps Col. Donovan may some day ease his mind by catching one himself!

It will be interesting to see if *Polygonia c-album*, which has again appeared in numerous localities in England after a lapse of many years, turns up in Ireland. One would have expected *Argynnis selene* to be common. The doubtful occurrence of *Plebejus argus* and *Aricia agestis* is curious (there are three specimens of the latter in the B.M. Coll. labelled "Dublin"), as is also that of *Adopoea sylvestris* and *Ochlodes venata*. The absence of *Sphinx ligustri* and *Mimas tilia*, *Hemaris fuciformis*, *Zygaena trifolii*, *Spilosoma urticae* and *Gastropacha quercifolia* is unexpected. *Aegeria culiciformis* is classed as doubtful, but the Rev. J. Greene (1866, *Entom.*, 3 : 156) says Haliday took it in Ireland. It is most interesting to hear that *Leucodonta bicoloria* is not uncommon; but why no *Notodonta trepida*? Birchall years ago threw doubt on Bonchard's captures of *L. bicoloria* and accused him of importing specimens from the Continent!

Are there no reed-beds in Ireland? *Calamia phragmitidis*, *Senta maritima*, *Nonagria dissoluta* and *N. geminipuncta* should be there. Perhaps lack of knowledge of their habits is responsible for their absence from the list.

The Dianthoecias are strongly represented. As regards the author's suggestion that *D. barrettii* Dbl. should be regarded as a separate species because it is of a browner colour than *D. andalusica* (which has the prior name), the best way probably would be to treat them as subspecies. We hardly think that Mr. Tams, when he said *andalusica*

and *barrettii* were identical, meant more than that they agreed inasmuch that both had similar broad spines on the aedaeagus; a more detailed examination of the genitalia might possibly show other differences.

Taking the Geometridae as a whole, they seem to be better represented than the Noctuids. The mention of ancient oak woods makes one think of *Comibaena pustulata*; possibly light would prove if it occurred. But why are there no *Collix sparsata*, *Philerme vetulata* and *P. transversata*, *Acidalia emutaria* and *Brephos parthenias*? When will someone as enterprising as Col. Donovan tackle the Microlepidoptera?

The catalogue is clearly printed and has a good index, but it is a pity that the scientific names are not all italicized, and the new names, of which there are many, not more clearly indicated. Although "printed for private circulation", the catalogue is advertised for sale, and must therefore be considered as duly published; otherwise the new names would be invalid.

H. M. E.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—*February 13th*, 1936.—Mr. M. Niblett, President, in the Chair.—Mr. A. J. Musgrave exhibited a varied collection of insects from Brazil; Mr. H. J. Turner, examples of eleven genera of *Pieridae* from Ecuador. A large number of lantern-slides were shown by Messrs. Doudeney, De Muth and Hughes, depicting collecting-grounds in various parts of the country, many of them views in the Shetlands, and also a selection of the slides bequeathed by the late Mr. R. Adkin.

February 27th.—The President in the Chair.—Mr. E. J. Bunnett exhibited numerous cases of caddis-fly larvae, some made in nature, others from artificial material given them, *e.g.* silk, match-sticks, coal-dust, etc; Mr. G. B. Oliver, larvae of *Limenitis camilla* (*sibilla*) in their hibernacula; Mr. S. Wakely, two species of coleopterous larvae from Finsbury, found under old cork lino, *Attagenus piceus* and *A. trifasciata*; Dr. E. A. Cockayne, a series of *Odonotopera bidentata*, part of a brood from a Rannoch ♀, and pointed out the characteristics of the resultant forms; Mr. Hy. J. Turner, a small collection of the Pierid genus *Catantacta*, an exclusively American genus, and a store-box of Indo-Malay Danais of the *plexippus* group. Mr. Downes read a paper on Insect Metamorphosis.—HY. J. TURNER (*Hon. Editor of Proceedings*).

A CORRECTION.—p. 11, line 18, for "more highly specialized" read "less highly specialized". The passage occurs in Prof. B. N. Schwanwitsch's article on Wing Patterns in Papilionidae. p. 7, line 15, for "Menke" read "Henke",—N. D. R.

THE ENTOMOLOGIST.

VOL. LXIX.]

JUNE, 1936.

[No. 877

THE COLLECTION AND ANALYSIS OF RECORDS OF MIGRATING INSECTS, BRITISH ISLES, 1931-1935.

By MRS. K. J. GRANT, F.R.E.S.

THE Insect Immigration Committee of the South-Eastern Union of Scientific Societies has now been in existence for five years, and during this period it has been able to collect several hundred records of actual movements of insects, mostly Lepidoptera, and several thousands more which show the distribution of various species on different dates. The following notes are intended to give a short account of the methods which have so far proved most useful in the investigation of these records, and to indicate some of the conclusions, necessarily very tentative at this stage, which may be drawn from them.

In handling the records that come in to Rothamsted Experimental Station, Harpenden, each observation is copied out on to a separate standard index card, unless it is already available in this form, and filed chronologically under the name of the species concerned. The most straightforward way in which this mass of information may be approached is to separate out those cards giving an indication of unidirectional flight, and from them to construct diagrams to show the movements that prevail during any period which it is desired to study. Observers are asked to record the flight-direction of even single individuals whenever it is definite; if a number of such observations are examined together, the random flights of non-migrating individuals will cancel one another out, and the remainder will indicate the direction and strength of any migration which has taken place. As migration slackens, the proportion of random flights will increase, until finally no one direction predominates over the rest. When a sufficient number of records is available, we may be able to distinguish between different waves of migration, with quiet periods between them, and perhaps with a change of direction when flight is renewed. Indications that something of the kind takes place may be found among the records already received, but our information is as yet inadequate to show such details with any accuracy. In the meantime some interesting results have been obtained by collecting together the records of two or more years on one diagram; broad seasonal

differences are thus shown quite clearly, but of course all detail is obscured. A series of diagrams made by combining two years' records of the Red Admiral, *Vanessa atalanta*, is shown in Fig. 1, which serves to illustrate the method used. The Clouded Yellow, *Colias croceus*, the Painted Lady, *Vanessa cardui*, as well as the Red Admiral, have so far been treated in this way, and north and north-west are shown to be the prevailing flight directions in each species during the spring and early summer. In August migration practically ceases, but it is resumed again in September and October, when there is a considerable amount of evidence in favour of a southward flight in *V. atalanta*, less in *C. croceus*, and still less in *V. cardui*. In early September there seems to be some overlapping of south-easterly with north-westerly flights in some species, and it is most important that observers should record the direction in as many cases as possible, so that this and other such details may be more closely investigated.

In by far the greater number of cases only the presence or absence of migrant species is recorded, their arrival or departure having taken place unseen; but from these observations it is possible to make maps or graphs showing how the distribution has varied from day to day, and when there are sufficient data attempts may be made to deduce the movements that must have taken place to produce the observed results.

A very useful form of diagram for this work is shown in Fig. 2. Here the graph is divided into a number of horizontal sections, one to each degree of latitude; horizontal distance shows time, and each column therefore represents the number of insects observed on a given day over one degree of latitude. It is clear that a diagram of this kind will be strongly affected by the distribution of observers, and one of the difficulties that we have to contend with is due to the fact that we have about half as many in the North of England as we have in the southern counties, and there are even fewer in Scotland. In order to compensate for this, all the insects seen in one day within a degree of latitude are added together, and the total is divided by the number of cards on which the observations are recorded. This gives a separate average of "insects per card" for each degree which does not depend wholly on the number of observers, though naturally the more they are, the greater the accuracy of the average is likely to be.

This necessity for the arithmetical treatment of observations makes it all the more important that observers should give actual counts of insects wherever possible, and when this is inconvenient, that they should at least give numerical estimates. It is obvious that to divide "fair numbers" by "the late autumn" is a feat beyond any statistician, whereas "dozens daily (never more than

60) from 8th to 20th September" does at least allow of some reasonable approximation being reached. These non-numerical estimates are apt to vary, not only with the observer, but also with the species involved. A person seeing 20 Oleander Hawk

Flights of *Vanessa atalanta* 1934 & 1935

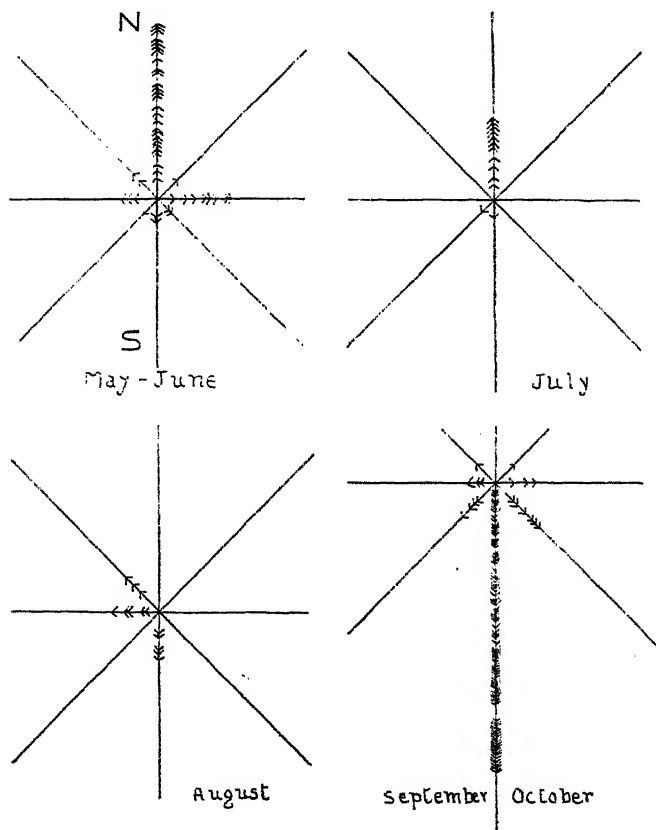


FIG. 1.—Analysis of the flights of *V. atalanta* observed in 1934 and 1935 in the British Isles. Each arrow represents one insect; groups of arrows represent flights.

Moths on an allotment in a London suburb might be forgiven for announcing that there were "swarms" of them, and even a cautious person would probably say there were dozens, whereas had they been Large White Butterflies, he would probably only say that he believed there had been "quite a few."

Vanessa atalanta L. Distribution in 1933.

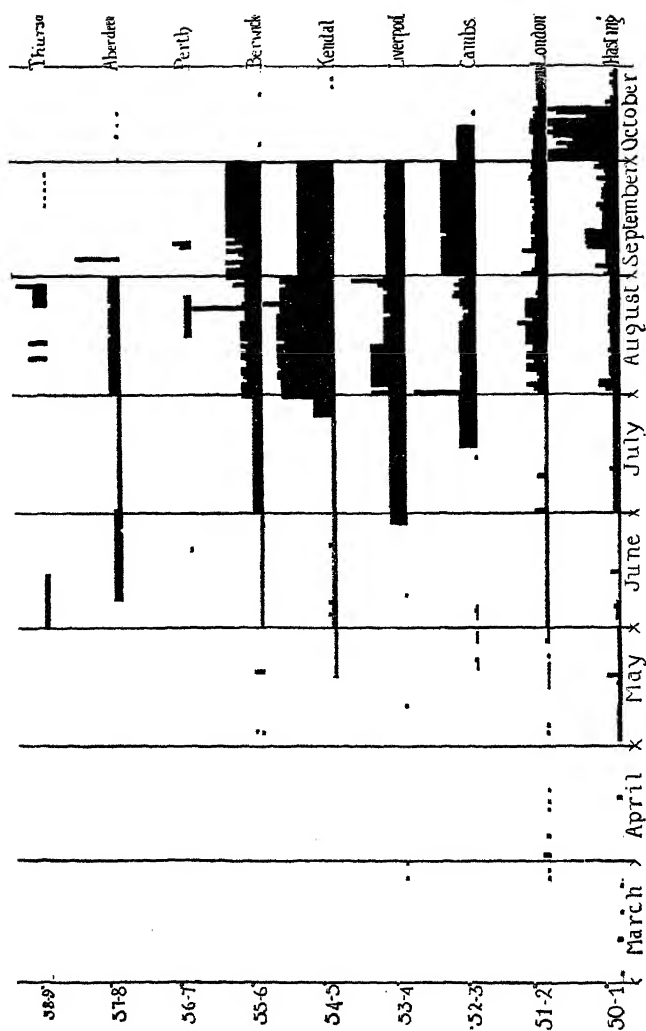


FIG. 2.—Distribution of *V. atalanta* in the British Isles in 1933, by latitude. The unit is: insects recorded per observer per day in each degree.

To return to a consideration of Fig. 2 and its possible interpretation, it will be seen that this diagram shows the distribution of *Vanessa atalanta* during 1933, the vertical columns representing the number of "insects per card" recorded in various latitudes from March to October. Single individuals, which may have been either migrants or hibernated specimens, were observed here and there in the South of England from the beginning of March, appearing further and further north as the spring advanced. In May undoubted immigrants were seen, some of them being observed coming in over the sea on the south coast. These, too, moved northward, until the species had established itself throughout England and Scotland, as far as Thurso, in Lat. $58^{\circ} 35' N$. From July onward, larvæ and newly emerged individuals began to appear, the summer generation being most numerous between Lat. 54° and $56^{\circ} N$. After the end of September, however, the numbers in the north decreased rapidly, until only a few solitary individuals remained, while at the same time the species became far more common on the south coast than it had been even in the height of summer. The significance of this reversal of the summer distribution lies in the fact that it may be very plausibly explained as the result of southward migration, and so forms a strong reinforcement of the conclusions which were drawn from an examination of Fig. 1 and similar diagrams. It is unlikely that the sharp and sudden decline of numbers in most latitudes in the British Isles shown on the graph at the end of September bears any relation to reality. The disappearance was probably far slower than that, but only an increase of observations in which the "tailing off" of numbers in late autumn is carefully recorded will correct this error. In fact, in 1935, when several observers were making daily counts, the decline is found to be much more gradual.

Interesting comparisons may be made between the graphs made under the same circumstances for two different species. For example, a diagram of the distribution of the Painted Lady in 1933 is very like Fig. 2 in general appearance, but there are one or two marked dissimilarities in detail. One of the most noticeable is the almost complete absence of *V. cardui* records during the month of July, when the species is in the larval stage, and migration seems to cease. This is quite unlike *V. atalanta*, in which records of arrivals on the south coast show that migrants are still coming in after the earlier individuals have laid their eggs and died.

In 1933 hardly any Painted Ladies were observed in the Highlands, though the species was common in Southern Scotland, and small numbers were seen in the extreme north, around Thurso. This was at first put down to an absence of observers from the Highland districts, but when the Red Admiral diagrams were

drawn it became clear that this could not be the right explanation. Observers had been present and they had recorded *atalanta*; *cardui* was not reported because it was either absent, or in such small numbers as to pass unobserved. Another interesting comparison between the two species arose when an observer mentioned that *cardui*, after being common in his district, had completely disappeared on a certain date, but that *atalanta* had remained the whole time. This information was of particular interest, since it confirmed his observation of *cardui*'s absence, and showed that it was not an apparent effect due to dull weather causing all butterflies to remain hidden, or to some similar cause which had no bearing on migration.

From such considerations as these, the idea arose of using a "control" insect—in other words, making parallel observations on an indigenous species for comparison with those carried out on migrants. The results should help us to decide which phenomena common to both classes of insect are not of direct interest in the subject under investigation, and which, found in migrant species alone and absent from controls, are most probably the effects of migration. The Peacock, *Nymphalis io*, was at first suggested as the most suitable control, but after using it for the summer of 1935, it has been found rather unsatisfactory in several ways, and the substitution or addition of the Small Tortoise-shell, *Aglais urticae*, has been proposed. It is therefore hoped that observers will add these insects to their Class (A) group and make the most complete observations upon them that they can, giving daily or weekly counts wherever they are able to do so.

Another question in the solution of which it is hoped that observers will co-operate is whether the Red Admiral is able to hibernate in this country, and if so, to what extent. Several reports of its presence in winter have already been received, but unfortunately in some cases further investigations have shown that they rest upon misidentification. It is therefore asked that whenever possible specimens should be sent in with reports, in order that the determination shall be certain.

Information concerning the sex of migrating insects is also a matter of considerable interest, and it is hoped that observers will report it whenever possible.

Maps and diagrams, similar to those illustrated, have been made for several species, but it is impossible to deal with them here owing to lack of space. They illustrate the great variation in numbers which occur from year to year, but do not give any indication of periodicity so far. This may be due to the short time covered by the records. When they are compared with one another one is forced to the conclusion that something over a thousand records

are necessary to make a good diagram of the type of Fig. 2. This means that we need more numerous or more regular observers, since we have only been getting such numbers of records in "good" years, and no species has a "good year" every year. It is to be hoped that more people will make a regular count once a week at least of the most important Class (A) species and the "controls", reporting those occasions when the insects are absent as well as their numbers when they are present, since this gives us the best chance of getting satisfactory results in a reasonable space of time.

In conclusion our thanks are due to those who have so patiently and carefully collected our records for us, and in particular to our helpers in lighthouses and light vessels, without whom some of our most interesting results could not have been achieved.

Rothamsted Experimental Station,
Harpenden;
May 1st, 1936.

HADENA SATURA AT WICKEN.—Tutt in *Ent. Record*, 8 : 186, 1891, recorded the capture of two specimens at Wicken, but doubt has been expressed as to whether they were not only richly marked forms of *H. adusta*. These specimens were ultimately sold at Stevens's on September 19th, 1911, Sale No. 12032, Lot 25. Can anyone tell me where they are at present? The information is required in connection with the preparation of the Cambridgeshire list for the Victoria County History.—H. M. EDELSTEN; Bramble Hill, Balcombe.

PYRGUS ALVEUS IN NORFOLK.—It may be of interest to record that the Norfolk specimens of *P. alveus* (cf. *Ent. Mo. Mag.*, 39 : 90) have recently found their way to the Castle Museum, Norwich, in the collection of the late Theodore Henry Marsh, together with three letters concerning them from James Edwards, and the dissection he made.—FRANK LENEY; Curator, Castle Museum, Norwich.

SECOND BROOD ERYNNIS TAGES.—I took a female of this species at Alum Bay, I. of Wight, on August 11th, 1935. It was perfect, but not noticeably different from spring N. Wales specimens, except that the light markings were, perhaps, a little more pronounced.—J. A. WHELLAN; 81, Chantrey Street, Liverpool 7.

VANESSA ATALANTA IN APRIL.—While in Slough High Street a few weeks ago I was surprised to see a large number of Red Admirals flying about; at a rough estimate I should say there were between thirty and forty insects. It seems that these butterflies must have been hibernating in a nearby alcove of a boiler-room, for a small boy standing by said that he had seen them "fly out of a hole in the roof".—DENNIS E. BALLINGER; The Cottage, Canham Road, Acton, W. 3.

BRITISH LEPIDOPTERA COLLECTING, 1935.

By C. G. M. DE WORMS, PH.D., F.R.E.S.

(Continued from p. 107.)

At light in the hotel we took *Plusia festucae* and *Abrostola triplasia*. On the next morning, the 30th, we began the rather laborious climb of the Langdale pikes, the top of which we reached by midday in a deluge of rain. After waiting for two hours for a respite from the relentless downpour we decided to descend the slopes empty-handed. However, when nearly half-way down the mountain-side we noticed the sky brighten somewhat, and eventually made up our minds to ascend to the topmost plateau once more. Our renewed efforts met with their reward, as about 4 p.m. in a glimmer of sunlight *Erebia epiphron* began to fly in great numbers, and it did not take us long to obtain a very good and fresh series, though, as is always the case with this insect, females were extremely few and far between. *Parasemia plantaginis* was also well on the wing and very active. We also secured a good series of this insect, as well as several of the f. *hospita* and some heavily suffused females. We returned southwards by train that night with a joint "bag" of some 250 specimens for our twenty-four hours in the north.

PART II.

Throughout July there was an almost uninterrupted spell of fine weather, which was conducive to some very profitable collecting. I paid a further visit to Tilgate Forest on the 2nd in company with Mr. Lawson, but the night was much less favourable than on our previous expedition. The only species not observed on the former occasion that came to light were *Palimpsestis* or, *P. duplaris*, *Lithosia mesomella* and *Hydriomena impluviata*. On the afternoon of July 6th, a very warm day, I revisited Alice Holt Forest, but though *Limenitis camilla* was flying in some numbers I did not see any varieties. I continued my journey that afternoon via the New Forest to Lymington, where I managed just to catch the evening boat and reached Freshwater about 8 o'clock. I had quite a successful night's collecting on Tennyson Down. There was a fair sprinkling of common insects on sugar, including a few *Pyrrhia umbra*. Some bunches of umbelliferous flowers placed at intervals along the edge of the cliff duly attracted several *Agrotis lunigera*, while at the lamp the most abundant visitor was *Lithosia irrorella*, of which a comparatively large form exists in this locality. I returned early on the 7th to the mainland and spent the day in the New Forest, where *Argynnis paphia*, *Limenitis camilla* and *Polygonia c-album* were to be seen in good numbers.

On the 10th I motored down from London to some of the marshes bordering the Medway between Rochester and the Isle of Sheppey. It was a sweltering night, and one of the few occasions when both sugar and light were equally well patronized. Unfortunately some of the choicer species which were sought were already past their best. In this category were *Leucania favicolor*, fairly numerous at sugar, and also *Senta maritima*, flying freely in an adjoining reed-bed, in which I took several cream-coloured females of *Cosmotriche potatoria* as well as *Nudaria senex*, *Leucania straminea* and *L. phragmitidis*. Captures at the lamp included two females of *Malacosoma castrensis*. On July 15th *Argynnis aglaia*, *A. cydippe* and *Aphantopus hyperantus* were all in good numbers in the Berkshire woods.

On July 20th I began a fortnight's holiday, which I started in the south of England. That evening I joined Mr. Lawson near Selsey. It was a fairly favourable night for sugar, the chief visitor being *Agrotis ripae*, which was still in quite fresh condition. We took a few *Hama abjecta* on this occasion, but Mr. Lawson subsequently obtained a good series in this locality. We also saw a good many *Mamestra trifolii* and *Leucania littoralis* as well as a fair number of commoner species.

I reached the New Forest on the 23rd, but drew a blank that night. I spent the following day in the northern part of the Forest, but in spite of ideal conditions I was surprised to note the apparent scarcity of most of the usual butterflies. This was particularly noticeable in the case of *Argynnis paphia*. *Aphantopus hyperantus*, however, was in unusually large numbers, and several good lanceolated forms were taken. I pitched the lamp that night in Rhinefield's Enclosure, obtaining some better results. *Boarmia abietaria* was quite plentiful, as also was *Lymantria monacha*. I also took two female *Lithosia quadra* at light, but saw only one *Catocala promissa* on the patches. I proceeded to Swanage the next day, and at once observed a great difference in the butterfly population of the Downs as compared with that of the woods. I have never seen such a profusion of *Agapetes galathea*. In the evening they were to be found clustered by the score on the the grass-stems. *Adopoea acteon* was almost equally plentiful—distinctly more numerous than in many previous seasons. That night, July 25th, I tried light on the Studland sandhills, and took a good series of the local form of *Agrotis vestigialis* and of *Leucania littoralis*. I was much surprised when an *Anarta myrtilli* turned up at the lamp. There were plenty of other insects, including many *Malacosoma neustria*, *Lithosia lurideola*, *L. griseola*, as well as f. *stramineola*, together with a form intermediate between this and the type. On the 26th and 27th I did a good deal of collecting on

the Downs and in the valleys to the west of Swanage. In this district *Lysandra corydon* was on the wing in great profusion and showing a good percentage of variety, chiefly tending towards obsolescence. Here again there was evidence of the abnormal numbers of *Satyrus galatea* and *Adopoea acteon*, while *Argynnis aglaja* was careering over the downlands in great plenty. There was even an unusual abundance of the chalk form of *Plebejus argus*, with a good proportion of a curious *discreta* and *juncta* form.

In company with Mr. A. G. Russell I paid a visit to Portland on July 27th. We set up our lamps on the eastern side of the peninsula, but it turned out a very boisterous night. However, there was a fair amount at the sheet. Among the first arrivals were *Acidalia degeneraria*, mostly somewhat worn. *Gnophos obscurata* was also in evidence, as well as *Agrotis lunigera*, *Bryophila perla* and many *Caradrinas*. Sugar, on the other hand, was a complete blank. I left Swanage on the morning of the 29th on my way back to Surrey. I stopped en route near Wareham and found *Eumenis semele* flying in numbers on the heaths and also took *Selidosema ericetaria* in fresh condition.

That night I travelled up by rail to Scotland, and reached Aviemore about midday on July 30th in a blaze of sunshine, but I was disappointed to find so little on the wing. On the heathy ground there were still a few *Argynnis aglaja* and the large single-brooded form of *Polyommatus icarus*. I was surprised to find several *Coenonympha tullia scotica* still about and in fairly good order, especially the females. Larva-beating was more profitable, particularly among the small birches, where I dislodged a few full-fed *Endromis versicolor*, also several small *Demas coryli*, *Notodonta dromedarius*, *Lophopteryx camelina*, *Drepana lacertinaria*, etc. I proceeded the same evening to Forres, where I spent the next six days in rather indifferent weather conditions. I carried out some collecting that night on the Culbin Sands, but on this and two subsequent occasions both ragwort blossom and sugar yielded a very meagre and discouraging harvest, many of the choicer and much sought species appearing to be entirely absent. There was a sprinkling of *Triphaena comes* f. *curtisii*, a good many *Noctua baja*, *N. umbrosa*, dark forms of *N. xanthographa*, a few *N. dahlvi*, *Orthosia suspecta*, and some very fine *Cidaria immanata*. Three nights' collecting on the Findhorn Sandhills was a great contrast. There insects were in prodigious numbers on the heather flowers, above all the *Agrotids*. On August 1st in a few minutes I had over fifty *A. vestigialis* on the sheet at once. This local form is appreciably different from those in the south, being generally darker in ground-colour. The numbers and forms of *A. cursoria* were no less remarkable, existing from the palest buff to dark brown. *A.*

tritici was also to be found in innumerable types, chiefly much darker and more brilliant than the more southern races. *Noctua strigula* and *Miana literosa* were about in plenty, and also a few *Stilbia anomala*. I saw no *Agrotis praecox* or *A. agathina*, which I subsequently heard only appeared a fortnight later. Day collecting was fairly productive. On July 31st *Erebia aethiops* was just starting to appear in the Culbin Sand area, where the beating of alder trees flushed several of the very dark forms of *Mesoleuca bicolorata*, while on the Findhorn heath was flying a very brilliant local type of *Eumenis semele*, somewhat differing from the true f. *scotica*. On August 2nd I made a journey to the highlands near Dava, which gave its name to the Large Heath. On the edge of the moss on which this occurs I put up several *Perizoma minorata*, which seem to be most active about 5 p.m. I also flushed a good many *Larentia caesiata* resting on rocks and also a single *Gnophos myrtillata*. Leaving Scotland on the night of August 4th, I travelled south again and carried out some collecting on Bank Holiday, the 5th, in Sussex, where there was a good deal on the wing both in the woodlands and on the Downs. In one locality I came across quite a number of *Maniola tithonus* having extra spotting on the upper wings. On the way back that evening I halted at Boxhill and obtained a good variety of insects at light, including *Lithosia deplana*, *L. complana*, *Boarmia abietaria*, *Eupithoea sobrinata*, *Acidalia ornata* and *Aspilates gilvaria*.

I had not been to Wicken in the latter part of the season for a number of years. Mr. Craske and I paid a short visit there on the night of August 10th and had quite a satisfactory haul. We found *Tapinostola hellmanni* flying and settled on the reeds in one portion of the Fen and secured a nice series. *Nonagria arundineta* was also in the same area, though less numerous. *Epione apiciaria* was very common, likewise *Lygris testata*. At sugar *Helotropha leucostigma* was fairly abundant. In the Fen on the next morning a few *Papilio machaon* were on the wing, while larvae of *Pygaera pigra* were to be found everywhere in the spun leaves of the dwarf willow. On the way home we stopped at Royston Heath, where we were pleased to find *Lysandra coridon* more plentiful than it had been for many years. *Hesperia comma* was in its usual numbers in this area.

I was again in the Folkestone district on August 17th. At Dungeness that night *Bombyx trifolii* was commoner at light than for a long time. On the 18th *Lysandra bellargus* was just beginning to emerge on the Downs, while the local woods provided a nice lot of larvae of *Cucullia asteris*.

(To be continued.)

BULGARIAN RHOPALOCERA, JUNE AND JULY, 1933.

BY P. HAIG THOMAS.

(Concluded from p. 103.)

Anthocharis cardamines, S., Kos., Kar.*Gonepteryx rhamni*, S., Kos., Kar.*Colias hyale*, Kos., Kar.*C. croceus*, S., Kos., Kar.*C. myrmidone balcanica*, S., June 20th to July 25th. It had disappeared from the low ground by the end of June.*Leptidea sinapis*, S., Kos., Kar.*L. duponcheli*, one first generation, S., second generation common Kar.*Erebia epiphron* var. *orientalis*, local at S., July 24th, not out at Kar.*E. ceto* var. *phoreys*, one male, Kar.*E. medusa* var., S., Kar., where it was very common and large.*E. medusa* var., Kos., a small race compared with the race from S. and Kar., fairly common.*E. aethiops*, Kos., emerging July 23rd, a small race compared with those taken in Eastern Alps.*E. euryale*, Kos., emerging July 18th.*E. ligea*, Kos., July 18th; Kar., July 15th.*E. lappona*, Kos., 7200 ft., July 24th, one fresh male.*Agapetes galathea*, S., Kos., Kar.*Aulocera proserpina* (*circe*), S., Kar.*Hipparchia fagi* (*hermione*), Kar.*Satyrus cordula*, Kar.*Pararge aegeria*, S., Kos., Kar.*P. roxelana*, S., a few at beginning of Large Gorge, Kos., on Cherkivessch and Kar.*P. megera*, S., Kos., Kar.*Aphantopus hyperantus*, Kos.*Maniola jurtina*, S., Kos., Kar.*M. lycaon*, Kos.*Coenonympha arcania*, Kos.*C. pamphilus*, S., Kos., Kar.*C. rhodopensis*, very common, Kos., 4500-5200 ft.; a closely allied race, common, Kar., 4500 ft.*C. leander*, S., Kar., common.*Apatura iris*, S., a few, July 23rd.*A. ilia*: Dr. Higgins went in search of *ilia* July 18th and took two *A. metis*, a race described from S. Russia. They were worn (Dr. Higgins).

Neptis rivularis (*lucilla*), common at Kos., E., June; Kar., M., July, up to 4000 ft.

Limenitis populi, a few any day, S., E., June to July 20th, also Kar.

L. reducta, one at Kos.

Vanessa atalanta, S., Kos., Kar.

V. cardui, S., Kos., Kar.

Nymphalis io, S., Kos., Kar.

N. polychloros, S., Kos., Kar.

N. xanthomelas, one at Kos., not seen at S.

N. antiopa, S., Kos.

Aglais urticae, S., Kos., Kar.

Polygonia c-album, S., Kos., Kar.

Melitaea cinxia, S., Kos., Kar.

M. phoebe, S., Kos., not seen at Kar.

M. didyma, S., Kos., Kar., very variable, some specimens not distinguishable from normal *didyma*. Others like the pale Greek race.

M. trivia, very common, S., Kos., not so common Kar.

M. aurelia, S., up the Prison Gorge and above the road to the right of the main river. Not seen elsewhere.

M. athalia, common, S., Kos., very common and many very dark specimens 4300 ft. Kar.

M. diamina (*dictynna*): Dr. Higgins took a few in a field below Kos., end of July.

Argynnis aphirape, Kar., only 4500-5200 ft., fresh middle of July, only one female.

A. selene, a small dark race, common, Kos., 5000-6000 ft.

A. euphrosyne, S., Kos., Kar.

A. pales, Kos., only on Belmeken, 7200 ft.

A. graeca, Kos., rare this year, 5000-6000 ft.

A. dia, Kos., only a few mid-July.

A. hecate, S., a few males, Prison Gorge. One male near Renaissance Hotel, Kos.

A. daphne, S., Kos., Kar., not uncommon.

A. lathonia, S., Kos., Kar.

A. aglaia, S., Kos., Kar.

A. cydippe and f. *cleodoxa*, S., Kos., a small pale race. *Cleodoxa* predominant.

A. niobe and f. *eris*, S., Kos., Kar.

A. paphia, Kos., Kar.

A. maia (*pandora*), S., Kos., Kar., not uncommon.

Callophrys rubi, S., Kos., Kar.

Strymon spini, S.

S. ilicis, S., Kos., Kar.

S. acaciae, Kos., Kar., common locally.

S. pruni, Kos., common locally; we did not find it till it was warm.

Thecla quercus, Kos., just emerging, July 22nd.

Lycaena virgaureae, Kos., common, males only, July.

L. thersamon: Dr. Higgins took one male and one female at Kos., June.

L. dispar rutilus, S., Kos., inclined to be small, E., June.

L. hippothoë, Kos., Kar., common.

L. alciphron, S., Kos., Kar., common.

L. tityrus (dorilis), S., Kos., Kar.

L. phlaeas, S., Kos., Kar.

Everes decolorata, S., not common; emerged all through June; quickly worn.

Cupido sebrus: I took about a dozen specimens in the Prison Gorge at S. Dr. Buresch considers it very scarce in Bulgaria.

Plebejus argus, S., Kos., Kar.

P. zephirus, S., common locally. This insect does not occur at Kos.

Lycæides argyrognomon, S., July.

Philotes vicrama, S., Kos., common.

Scolitantides orion, S., Kos., very common.

Aricia agestis (astrarche), S., Kos., Kar.

A. chiron (eumedon), S., Kos.

A. anteros, S., Kos., Kar., males common, females rare.

Polyommatus eroides, Kar., Kos., not uncommon. Dr. Binder took it at S., 1932.

P. icarus, S., Kos., Kar.

P. amandus, locally common, S., Kos.

P. meleager, S., Kos., but not fully out at S. when I left.

Lysandra bellargus, S., Kos., Kar.

L. coridon, just emerging Kos., E., July.

Agrodiaetus admetus, Kar.

Iolana iolas, common at S., all through June.

Cyaniris semiargus, S., Kos., Kar.

Glaucopsyche alexis (cyllarus), S., Kos., Kar.

Maculinea arion, S., Kos., Kar.

Celastrina argiolus, S., Kos., Kar.

Carcharodus fritillarius (alceae), S., Kos., Kar.

C. altheae, S., Kos., Kar.

C. lavatherae, S., Kos., Kar.

Spialia orbifer, S., Kos., Kar.

Pyrgus carthami r. *moeschleri*, S., common middle of June.

P. alveus r. *major*, Kos., common, July in Gorge.

P. armoricana, S.

P. malvae, S., Kos., Kar.

P. sidae, S., Kos., Kar.

Erynnis tages, S., Kos., Kar.

Carterocephalus palaemon, Kar.

Thymelicus actaeon, S., Kos.

T. sylvestris, S.

Ochlodes venata (*sylvanus*), Kos., Kar.

RECORDS OF *POLYGONIA C-ALBUM* IN 1935.—A certain number of records of this species came to hand in 1935 and were withheld with a view to summarizing them; but they were not so numerous as in the previous year, no doubt because the species has so consolidated its gains as to be no longer noteworthy in many counties. This applies particularly to Hampshire, Bucks, Surrey and West Sussex, from which counties only selected records are included below. In DEVON J. Cowley reported the species (two specimens) in the Mardle Valley, on the edge of Dartmoor between Buckfastleigh and Holme, on October 17th; and on September 7th, 1934, it was taken at Holme Chase in S. Devon by G. J. Sard. In DORSET Miss H. M. fooks reported it as common in her garden at Kingscote, Dorchester, on September 9th. J. F. D. Frazer reports that it is now well established in the ISLE OF WIGHT, at Freshwater Bay, Newport, Parkhurst, etc., having been first noticed at Newport in 1930. In HERTFORDSHIRE it was seen by G. G. Edwards at St. Albans, on September 30th, and at Haileybury College on October 18th and 19th by N. O. Rees. In W. SUSSEX the species has reached the southernmost limit of the county at last, having been seen at Selsey Bill on August 9th by John Riley; in E. SUSSEX it is also well established, being noted at East Hoathly on March 24th by S. A. Chartris, and at Crowhurst and near Hastings in August by H. G. Attlee. F. D. Welch reports that it reappeared again near Gravesend in North KENT. In MIDDLESEX it was again common at Uxbridge in March and April (J. Jackson), and in the LONDON district turned up once more at Chiswick, where it was seen by a niece of the Rev. J. E. Tarbat, but was not reported by Dr. Dawes. One was seen by L. J. Winter-Joyner at Ealing on March 18th; Dr. O. Baldwin reported it at Golders Green on September 9th, and one was seen at Haverstock Hill by W. F. H. Rosenberg on October 1st. In ESSEX it was observed at Romford by F. J. Simmonds on July 30th, and at Loughton on September 25th by G. R. Sutton. The Herts and Essex records are interesting in confirming the extension of range in these counties, but, on the other hand, the complete absence of records from the Midlands and northern counties suggests that the species has rather failed to establish itself there. It would be interesting to know, for example, whether the species has continued to appear in Lancashire, Lincoln, Notts, Norfolk, Suffolk and Cornwall, from all of which it has been reported.—N. D. RILEY.

NOTES ON BRACONIDAE: XV.—MICROGASTERINAE.

BY CLAUDE MORLEY, F.R.E.S., F.G.S., F.Z.S.

(Continued from p. 119.)

52. *A. obscurus*, Nees.—Captured examples were on Angelica flowers at Lymington in Hants on August 15th, 1901 (named by Marshall); Denny Wood in New Forest in June, 1907; Oulton Broad in September, 1900 (E. C. Bedwell); Felden in Herts (Piffard); Brandon, and beaten, with the above *A. decorus*, from pine at Barton Mills, June.

53. *A. tenebrosus*, Wsm.—“Nunton in Wilts” (Marshall MS.). One and its cocoon on leaf, just bred from British *Pterophorus pterodactylus* were sent on June 22nd, 1899 (Chapman; named by Marshall). Several emerged on October 13th–15th, 1899, from 28 *Apanteles*-cocoons that had evacuated an *Amphydasis betularia* larva in garden at Methley in Yorks on 7th of that month (Wigin). Captured in salt marsh at Hemley, Suffolk, August 15th, 1932.

54. *A. viminetorum*, Wsm.—Eight and a bundle of interwoven cocoons, with the flattened larva of *Tethea subtrusa*, taken at Bishops Wood, Selby in Yorks, on June 22nd, 1899, whence they had emerged on the same day; after evacuation the larva was quite lively and unattached to the parasites, but soon died of course (Ash).

55. *A. sodalis*, Hal.—Captured several times round Felden in Herts about 1900 (Piffard) and round Boston in Lincs in June, 1912.

57. *A. impurus*, Nees.—An apparently solitary ♀, with no cocoon attached, was sent me on May 6th, 1901, from Cannes, where it had emerged from some Tortricid termed “*L. paucillmana*” by Dr. Chapman. Several others were swept from roadside herbage at Burnham-Thorp in Norfolk on August 24th, 1906.

62. *A. coniferae*, Hal.—A ♀ was given me by C. G. Barrett, bred by him from *Retinia sylvestrana*, unlocalized. I have not captured the species, since beating a single ♀ in Walberswick salt marshes, Suffolk, on August 26th, 1898.

63. *A. lineipes*, Wsm.—One ♂ and a cocoon bred, doubtless not solitarily, from *Triphaena pronuba* at Liverpool in June, 1908 (J. Elton); 6 very typical ♀♀ and as many cocoons with the shrunk larva of *Melitaea helvetica*, whence they had emerged, in April, 1900, at Cannes or Locarno (Chapman). Common on the wing: In the New Forest (Miss Chawner); Shere in Surrey (Capron); and always in June at Shalfleet in Isle of Wight, Tuddenham in west Suffolk and on the windows of my house at Monks Soham, in whose garden on June 29th, 1910, I observed a dozen ♂♂ *Sigalphus pallidipes*,

Nees, walking excitedly about a laurel leaf in a shrubbery, vibrating both their wings and antennae, with all the appearance of being attracted by a female of the species, though the only other insect present was an entirely passive ♀ *A. lineipes*. I have heard of no association between the two genera.

64. *A. chrysostictus*, Msh.—I have a Surrey ♂ in Capron's collection.

65. *A. sicarius*, Msh.—The host "*Diasemia literata*, Scop., is a mistake for *Sericoris littoralis*, Curt., teste Bignell" (Marshall's MS.; cf. *Brit. Bracon.*, p. 210); 9 and 11 separate cocoons, with a single hyperparasitic ichneumon, *Mesochorus facialis*, Bridgm., ♀, bred from the accompanying shrivelled larva of *Diloba caeruleocephala* at East Grinstead in Sussex during 1908 (Henry Slater). Taken commonly at Shere in Surrey (Capron); Rookley Wilderness in Isle of Wight, August (Morey); and in Lincs at Boston, Skegness and Mablethorp during June.

66. *A. longicaudis*, Wesm.—Four very typical ♂♀ bred on July 3rd–9th, 1904, from larvae or pupae of *Sericoris littoralis*, Curt., collected in Isle of Purbeck, Dorset, on preceding June 4th (Bankes), which suggests conspecificity with the last!

67. *A. fuliginosus*, Wesm.—One and 8 cocoons bred in 1905 from larva of *Platyptilia acanthodactyla*, Hb., that was collected at Dartmouth in Devon during September, 1904; also 1 bred from *Epermia chaerophyllella*, Goe., from Salisbury in 1904 (Bankes); 1 and 3 cocoons bred from some "*Noctua* larva" at Burnley in 1914 (Clutton). A ♂ and its cocoon raised from *Hemaris fuciformis* at Watlington in Kent during July, 1903 (Goodwin). Frequently taken on the wing in June and July at Chard, Devon, in 1895 (DelaGarde); the Devil's Dyke near Brighton, Sussex, in 1909 (Elliott); Shere in Surrey (Capron); Diss in Norfolk and Louth in Lincs.

68. *A. corvinus*, Reinh.—Five larvae emerged on October 18th, 1900, from an *Abrostola urticae* caterpillar at Ely in Cambs and spun cocoons, of which at least one produced a ♀ of this parasite shortly before 10 a.m. on April 9th, 1901 (J. W. Cross). A ♀ and 2 cocoons raised from some Lepidopteron on July 3rd, 1896; 2 and 2 cocoons bred in July, 1905, from larvae of *Swammerdamia spinella*, Hüb. [*i. e. caesiella*, Hüb.], taken at Wareham in Dorset (Bankes). Abundant on the wing in May and June: Surrey in 1906 (Campbell-Taylor), where it was found at Greenings in 1871 (Saunders) and Shere (Capron); Felden in Herts (Piffard); and in 1907 in Isle of Wight (Morey), where it has occurred to me at Sandown, as well as at Killaloe in Tipperary in 1913; Monks Soham on windows in August, Depden in September, and copiously by sweeping reeds in brackish ditches about Southwold, also in Suffolk, during July

and September, 1907-11. Examples sent Mr. Lyle in 1917 were returned as unknown by, and new to, him.

69. *A. merula*, Reinh.—I have seen none bred. Captured sparingly at Shere in Surrey (Capron); ♀♀ among *Statice limonium* on the coast at both Holme in Norfolk on August 19th, 1906, and Southwold on September 11th, 1907, in Suffolk, where it occurred to me also on Angelica flowers at Rishangles in August, 1920.

70. *A. octonarius*, Ratz.—“Bred from *Stauropus fagi* by Bridgman” (Marshall’s MS.).* Three ♀♀ and cocoons, received on June 24th, 1899, when the parasites had just emerged from a yet live larva of *Pericallia syringaria* taken in Surrey; in all 5 imagines emerged on July 5th following (R. M. Prideaux). Another batch from the same host (Alfred Sich); 16 and cocoons from an unknown Lepidopteron in the New Forest in June, 1902 (Cross). A ♀ captured at Felden in Herts (Piffard).

71. *A. astrarches*, Msh.—Nine of both sexes and a dozen white cocoons, each showing the dark larval skin at the unevacuation end, still surrounding a shrivelled caterpillar of *Lycaena alexis*, whence they were bred at Tuddenham in west Suffolk during 1902 (Frank Norgate). Three ♀♀ raised from a larva of the Brown Argus, at Deal in Kent during July, 1912 (Bedwell). A half dozen captured at Shere in Surrey (Capron); singly at Lakenheath and the Bentley Woods in Suffolk.

72. *A. inclusus*, Ratz.—A ♂ was swept by me at Killaloe in co. Clare, Ireland, on June 17th, 1913.

73. *A. abjectus*, Msh.—Four ♀♀ and a solid mass of 20-30 enwoven cocoons were found on a grass-stem in Norfolk during 1910 (J. E. Campbell-Taylor).

74. *A. immunis*, Hal.—A half-dozen of both sexes at Shere, Surrey (Capron). “Bred from *Saturnia pavonia*, L., by Bignell” (Marshall’s MS.: *Bracon.*, 3: 179).

* “*Apanteles stauropodis*, Marshall.—At the end of September, 1888, Mr. Thouless gave me a group of cocoons of an *Apanteles*, which had been formed by larvae just emerged from a caterpillar of *Stauropus fagi*. On October 20th some of the parasites emerged. I could find no description of them: they appeared to come next to *A. octonarius*, Ratz. I therefore sent them to Rev. T. A. Marshall, who decided they were new to science and proposed the name *stauropodis*. He will describe them in *Spp. Hym. d’Europ.* *S. fagi* seems much infected with parasites; I have several species bred from this singular larva.—J. B. Bridgman, F.L.S.” (*Trans. Norf. Nat. Soc.*, 1889, p. 689).

It may be well, in view of Bridgman’s rather hasty and premature note, to point out that Marshall’s above reference of the *Apanteles* bred in Norfolk to *A. octonarius*, Ratz. (the MS. is confirmed in print at *Spp. Hym. d’Europ.* 5 bis: 179; which part, consisting of pp. 145-224, was actually published on April 1st, 1898), plainly indicates that later he changed his mind and considered it to be Ratzburg’s insect, leaving *Apanteles stauropodis*, undescribed by Bridgman, NOMEN NUDUM. No more than five Hymenopterous parasites are known to attack *S. fagi* (cf. *Trans. Ent. Soc.*, 1933, p. 143).—C. M.

(To be continued.)

NOTES AND OBSERVATIONS.

AN OLD RECORD OF VANESSA ANTIOPA.—Canon E. H. Goddard, of Devizes, informs me that about 1883 he took a *V. antiopa* on the wing at Hilmarton, near Calne, in North Wiltshire. The specimen, unlikely to have been a liberated one, does not seem to have been recorded.—N. D. R.

LEPIDOPTERA NEAR LANDS END.—The period August 17th to August 31st was spent at Sennen Cove, just N.E. of Lands End. The first week was very fine and dry and unsuitable for sugaring, but on the sandy slopes the flowers of ragwort and sea-holly were frequented by large numbers of *Agrotis tritici* and *A. vestigialis*. On ragwort I took a single specimen of *Caradrina exigua* and saw a few *C. ambigua*. The second week was devoted to the cliffs towards Lands End. With a lamp and sheet *Charaëas graminis* was encountered fresh and in great variety; two specimens of *Tholera cespitis* were attracted, a female *Epineuronia popularis* in addition to countless males, *Lasio-campa quercus* ♀, *L. trifolii* ♂, and a rather worn *Acronycta rumicis*. A single *Lithosia caniola* came to the sheet and several *Acidalia marginepunctata*. Light failed to attract any *Polia xanthomista*, but a single specimen was taken at sugar on the 29th in perfect condition. Larvae of *Pyrrhia umbra* were common by day on restharrow, as many as thirty-five being picked up in fifteen minutes. A few larvae of *Agrotis ripae* were seen after dusk.—HAROLD KING, D.Sc., F.R.S.; 28, Hawthorne Avenue, Harrow.

MACROGLOSSA STELLATARUM TAKING A SEA PASSAGE ON A STEAMER.—A relation, who is a good observer of nature, has recently returned here from Palestine. He tells me that he boarded a steamer for Trieste at Haifa, Palestine, on September 27th; as soon as he got on board the vessel he noticed a *M. stellatarum* flying about. This insect kept to the ship the whole way to Trieste, which was reached on October 2nd. By day it used to fly about the vessel, sometimes going out about 20 yards over the sea, and then returning to fly about the deck. The observer could never see where it settled for a long rest, but imagined that it was somewhere on the superstructure of the ship. I have already reported how I saw a *Vanessa cardui* take a passage in the same way from Hong-Kong to within a day of Japan. To my mind this suggests a solution of the problem as to how the *Danaus plexippus* which were reported in England in 1933 and 1934 reached their destination. Those reported from Cornwall would probably have arrived from American waters by steamers putting in at Falmouth, Plymouth or even Avonmouth. They might have arrived either as perfect insects or as pupae attached to the fruit carried by fruit cargo boats. Those arriving as pupae would have hatched out owing to the abnormally warm summer. The insect seen at Chichester might well have landed at Southampton.—B. TULLOCH (Brig.-Gen.); Hill Court, Abergavenny, October 10th, 1935.

HETEROCERA ATTACKING COTONEASTER HORIZONTALIS AND MICROPHYLLA.—In May of last year I was asked to examine some recently bought plants of *C. horizontalis*, the shoots of which were being webbed by larvae to such an extent that the plants were being destroyed. The larvae proved to be *Spilonota ocellana* Fab., a pest not hitherto recorded on this plant. Other species recorded are *Eurhodope suavella* Zinck., and *Ancylis achatana* Fabr., and on the Continent *Depressaria cotoneastri* Nick., and *Argyresthia sorbiella* Treits. In Oregon a new species of Gelechiad (*Cremona cotoneastri*, Buseck) has been discovered and should be looked for on all imported plants.—H. STRINGER; British Museum (N.H.), S.W. 7.

RECENT LITERATURE.

Monograph of the Genus Erebia. By B. C. S. WARREN. London, 1936, British Museum (N.H.). Pp. viii + 408. 104 plates. Price 50s.

The appearance of a monograph of such a characteristic Alpine genus as *Erebia* is an important event which will excite the interest of a large number of British entomologists. It is, indeed, obvious that the Lepidoptera have been strangely neglected in recent years, and most groups urgently require revision in the light of modern knowledge of the importance of anatomical structure. In the present volume Mr. Warren has undertaken a revision of the genus in the fullest possible sense, and he deserves the congratulations and gratitude of all entomologists. Not only is the nomenclature carefully revised, but the anatomy of the male genitalia, the neuriation of the wings and the shape of the androconia are all illustrated and discussed, and important observations upon the natural affinities of the species follow.

To take these points seriatim, the wing venation is found to be very inconstant, and is of little or no systematic importance. On the other hand, the androconia provide much useful information in specific or subspecific differentiation. The work upon these structures is largely original, very fully illustrated by eight plates of micro-photographs, and further explained by a most interesting introductory note. With regard to the male genital organs it is evident that these have been studied with extreme care, as is necessary in a group where so much individual variation occurs. The organs are illustrated in a series of 286 excellent reproductions of micro-photographs carefully chosen to show the range of specific and subspecific variation. This section, of course, is indispensable to any modern work, and should go far in preventing future errors of identification. The author is to be especially congratulated upon the uniformity and "clearness" of his preparations. In every case the lateral view only is reproduced.

The descriptive section with a revision of the synonymy is certainly not the least valuable part of the work. In every case the original description of the author of a name is inserted, and then the distinctive characters are indicated. This is an excellent arrangement. The genus was strictly defined by Mr. Warren some years ago and several familiar names are absent, including *parmenio* Boeber and *afer* Esp. At present the number of species is 69, but including racial and aberrational forms about 850 names are dealt with. These are illustrated by a magnificent atlas of plates, all reproductions of photographs, and greatly superior to coloured figures not quite of the first class. About 1300 figures are included, and this part of the work forms an outstanding feature. In every case variation is tabulated into subspecies, forma and aberratio, and the typical subspecies is fixed. The enormous labour involved in checking and compiling such a large number of references, scattered through a very wide literature, could be achieved only by an author of Mr. Warren's well-known capacity for detail, and it deserves the highest praise. The synonymy is sufficiently complete without being too elaborate. Such confusing units as *maurisius* Esp. and *theano* Tausch. are sorted out in a most satisfactory way, and we are particularly glad to see *adyte* Hb. firmly placed as the south-western form of *euryale* Esp. Several early names are introduced, the application of which we think is somewhat arbitrary. Many of the described subspecies have been very properly fused, but the specific analyses are very minute, and the number of names it has been found necessary to retain is still very large. Truly, in defining such races and forms it is difficult to know where to stop!

Where so much is given it is only human to ask for more. One of the most interesting features of many European Erebeids is the differentiation of a species into two main forms, such as occur for example in the case of *tyndarus* Esp. and *cassioides* Von Hohenw., or of *euryale* Esp. and *adyte* Hb. Although Mr. Warren is certainly wise in excluding long locality lists, we think that in such cases at least the most accurate information obtainable should have been included, and that references to large districts such as "Tirol" are scarcely adequate, particularly when more than one race occurs in the same region. Again, in writing of such species, Mr. Warren refers perhaps to the existence of "northern" and "southern" forms, but apart from this their existence is not emphasized. Yet the occurrence of these very obvious racial groups must have some meaning, possibly of real systematic importance, and they should surely be indicated in the terminology. A few distribution maps of such forms would have been very interesting, and a short zoogeographical discussion would not have been out of place in such a work as this. We should have welcomed, too, some reference to the female genitalia, and no mention is made of the possible influence of ecological conditions as a cause of variation.

The examination of specimens to determine subspecific boundaries must be an endless task, and it is scarcely possible for any author to

consult all the material available. What is most important is that the localities here given may be accepted as correct, and the author is always careful to state those cases where he has seen no specimens from any given region. *Apropos* of this it may be noted here that *tyndarus* Esp. and not *cassicides* von Hohenw. flies on the Nebelhorn in the Allgäuer Alps and on the Brenner, and was collected, too, by Mr. Haig Thomas some years ago on the Triglav, where *pharte* Hb. was also found.

A few well-known facts are omitted, no doubt accidentally. For instance *pararica* Chapm. is not restricted to Pajares, but is well known to occur in Western Leon and in the Picos district, while the typical *epiphron* Kn. of the Harz became extinct about the year 1900. We can find no reference to the occurrence of *epiphron* in Northern Spain.

The work is completed by a very adequate index, and a check list of all names and a short bibliography is included.

This volume will certainly become an indispensable basis for all further work upon the distribution and variation of this most interesting group of butterflies.—L. G. H.

A Monograph of the British Neuroptera. Vol. I. By F. J. KILLINGTON. London: Ray Society, 1936. Pp. xix + 269, 15 plates, 68 figs.

The publication of a new monograph of the British Neuroptera should do much to stimulate interest in an order of insects which, in comparison with the larger orders, such as Lepidoptera and Coleoptera, has not had its proper share of attention. There can be no doubt, I think, that the attractiveness of a group from a collector's or student's point of view suffers if there is no reasonably up-to-date book of reference available from which he can name his captures. He wishes also to be able to learn what is already known of the habits of the specimens he captures, and whether his observations have been recorded previously.

The previous monograph of the British Neuroptera was written by McLachlan and published by the Entomological Society of London in 1868. Since that date, this work, supplemented by the papers of various authors, has been the standard work for British Neuropterists. Mr. Killington's new monograph, of which Volume I has just been issued by the Ray Society, promises to be a worthy successor. It is a book for the biologist as well as for the systematist, for in it one can find all that is known of the life-history and morphology of the British Neuroptera.

The morphology of the imago is dealt with fully in the case of the family *Hemerobiidae*, with a shorter account of the other families. Of particular interest to the systematist is the section concerning the genital armature, the homologies of the various structures and the terms used in referring to them. Examples of the genital armature of both sexes in each of the families are figured and discussed.

Other chapters deal with the egg, the larva and the pupa, and

there is a valuable chapter on the bionomics of the Neuroptera. Tables are given showing the habitats of the various species, the months in which the adults may be found, the prey upon which the larvæ customarily feed, and a list of the species which have been recorded as suffering from parasitism, and the names of the parasites bred from them.

When so many good things are provided in this volume, one feels ungrateful in asking for more, but I hope that in the second volume there may be a short section devoted to the technique of collecting, breeding and preserving Neuroptera, and preparing specimens for examination of the genital structures. Particularly is the latter important in view of the value attached to these structures in systematic work, and the student will want to know how best to deal with his specimen so that he can examine and preserve the internal genital armature without destroying the remainder of the specimen.

Chapter 6 begins the account of the British species; in this volume are included the *Coniopterygidae*, *Osmylidae*, *Sisyridae*, and three genera of the *Hemerobiidae*. Since the publication, in 1929, of Mr. Killington's *Synopsis of British Neuroptera*, some changes in the nomenclature have been found necessary. Two alterations to the generic names have been made: *Eumicromus* Nakahara takes two species of *Micromus*, and *Nothochrysa fulviceps* and *capitata* have been transferred to *Nathamica* Navás. Two species have been added and one reinstated, and changes have been made in the case of eight other specific names. As far as possible the information concerning each species has been collected under the following headings: Synonymy, description of imago, habitat, oviposition, egg, larva, third instar larva, pupation, prey, checks, summary of life-history and distribution.

Figures of the ♂ genital armature are given, and, indeed, the whole volume is fully illustrated with excellent text-figures. Of the plates, special mention must be made of Mr. Killington's beautiful coloured drawings of the wing patterns of the *Hemerobiidae*. These are very well reproduced, and give an excellent idea of the appearance of the insect.—D. E. K.

Hymenopterorum Catalogus. Editus a H. HEDICKE. Pars I: Tiphidae, H. HEDICKE. 1936, pp. 1-32. Dr. W. Junk, Den Haag, Holland. Price 16s. 9d.; subscription price 5s.

Hymenopterists will welcome the appearance of the first part of this ambitious catalogue of the Hymenoptera of the world, to follow in the tradition of Junk's almost completed *Catalogus Lepidopterorum* and *Catalogus Coleopterorum*. It will come as a surprise to many that in the advertisement Junk estimates there are even now at least 150,000 described species to catalogue in all. This, on the present reckoning, makes Hymenoptera second only to the Coleoptera in numbers, despite the fact that detailed study of the vast parasitic groups has hardly yet begun. Thus it is safe to say that the Hymenoptera will probably prove far the largest order in the end,

At the same time it is difficult to see how the parasitic groups can be catalogued at present to any advantage, with synonymy, and arranged under genera; it remains to be seen whether these parts of the catalogue will be published; anyone familiar with the present chaos in these groups, and the vast variety of species, would hesitate to attempt it. In the present part it is a pity that the author has not seen his way to quoting on whose authority various species are sunk into the synonymy or transferred into other genera; in the later parts of this catalogue dealing with the lesser known groups it will be quite useless to quote synonymy without references, because so many names have been quite wrongly sunk into synonymy by mere guess-work. Furthermore, under each genus should be tabulated alphabetically every name that has ever been included in that genus. Finally, it is to be deplored that the author should think he has a right to amend names, according to supposed derivation, such as *Tiphia antigae* into *T. antigai*, and *T. cayennicola* into *T. cayennicola*. Once a name has been published and complies with the international rules, it loses any previous association of ideas, and becomes thenceforward simply the name of a species. The only exceptions to this rule are cases of obvious misprints, or emendations by the original author published at the same time and place as the original name.

ROBERT B. BENSON.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*March 12th, 1936.*—The President in the Chair.—Messrs. S. P. Doudeney, of Purley; B. J. Leader, of Bude; N. A. Richardson, of Hendon; and D. E. G. Kennard, of Vanbrugh Park Road, W., were elected members.—Dr. Joy exhibited a collection containing three-fourths of the species of British fleas; Mr. Hy. J. Turner, the very large race of the Hesperiid *Adopoea flava* (= *linea* = *thauomas*) from Macedonia, with normal-sized forms from Germany and Switzerland, and expressed the opinion that the name *sylvestris* which had been lately applied to it could not be correct in face of Poda's description "*linea lanceolata*". Lantern-slides were exhibited by Mr. Bunnett, and also a large selection of the slides bequeathed to the Society by the late Mr. R. Adkin were also shown.

March 26th.—The President in the Chair.—Mr. Niblett exhibited several galls from S.E. France; Mr. Musgrave, a false scorpion from Penn Woods, Bucks; Dr. Bull, a large larva of a coleopteron; Mr. Hy. J. Turner, long varied series of *Agrotis tritici* from many localities, and a series of the lepidopteron used to control the spread of the cactus plants in S. Africa and elsewhere, viz. *Cactoblastis cactorum*, sent by Mr. Sneyd Taylor from Graaff Reinett, where he is engaged in the breeding and distribution of the species; Mr. Stanley Smith read a paper on his experiences in the rearing of *Mellinea ocellaris*.—HY. J. TURNER (*Hon. Editor of Proceedings*).

THE ENTOMOLOGIST.

VOL. LXIX.]

JULY, 1936.

[No. 878

NOTES ON BRITISH ODONATA IN 1934 AND 1935.

By J. COWLEY, F.R.E.S.

DURING the summer of 1935 special attention was paid to *Agrion virgo*, in an endeavour to verify the remark of De Selys (1850, *Mém. Soc. Sci. Liège* 6 ["Revue des Odonates"] : 135) that he had received the South European race of this species from the South-west of England. Unfortunately the day selected for collecting in Cornwall proved to be wet (curiously always my experience of the county), and only one specimen was secured; but from my captures elsewhere, and from a series from West Cornwall in the British Museum, the form of the West Country is certainly not *Agrion virgo meridionale*, although indeed our southern and western examples (I have not seen northern specimens), differ from the *A. virgo virgo* of Central Europe, showing some approaches to subsp. *meridionale*; further research is necessary before the distinctness of our form can be settled. This question, and ecological notes on our species of *Agrion*, will be dealt with in future papers.

An expedition to the Fens of North Cambridgeshire in search of *Lestes dryas* was a failure, the appointed day being dull and overcast, the only species observed on the numerous dykes and drains examined being *Ischnura elegans* and *Enallagma cyathigerum*, and then only occasional examples of each. A visit to the habitat of *Coenagrion mercuriale* near Uffculme, Devon (indicated by Dr. F. F. Laidlaw), was also a failure, the boggy streamlet being very reduced and practically dry in places, so that it was a great surprise to see here a single example each of *Cordulegaster boltonii* and *Agrion splendens* ♂. A visit was also paid to the Grand Western Canal near Halberton, Devon, where Dr. Laidlaw believed he had once seen a Gomphine; the only Odonata proved to be numbers of *I. elegans* and *E. cyathigerum*, and a single *Agrion* ♂, probably *A. splendens*.

A short afternoon's collecting in Taw Marsh, on Dartmoor, produced seven species, *C. boltonii* predominating; an *Aeshna juncea* was stalked in the heather, and on effecting the capture the net proved to contain a pair of *C. boltonii* as well!

At Wicken Fen, July 2nd, 1935, I noticed a *Coenagrion pulchellum* ♂ with a black spot at the base of the wings; on capture the spot proved to be a Ceratopogonid (Diptera); an examination of the

few other captures brought to light another fly on a *Lestes sponsa* ♀ juv. (this latter specimen erroneously labelled *L. dryas* by me, and recorded under that name by Dr. Macfie; but the specimen, which is before me, is certainly *L. sponsa*, as I knew at the time. I can only account for my error, not detected until I read Dr. Macfie's paper, as a wish-fulfilment, as I was hoping to find *L. dryas* that season). These Ceratopogonids were placed in the hands of Dr. J. W. S. Macfie, who describes them as a new species, *Pterobosca paludis* (Macfie, 1936, *Proc. Roy. Ent. Soc. Lond.* (B), 5 : 62-64, 5 figs.). This is the first definite record of Ceratopogonidae on Odonata in Europe, although they are already known to attack Odonata in the East Indies, New Guinea and Africa (Macfie, 1932, *Tijdschr. Ent.*, 75 : 265-283, 7 figs.). Michelmores (1929, *Nat. Hist. Wicken Fen* : 477) records having seen at Wicken Fen an *Aeshna grandis* "carrying on its wings a number of minute black flies. The specimen has most unfortunately been destroyed, but it is probable that the flies were a species of *Scatopse*, though they may just possibly have been Ceratopogonids". Edwards (1932, *Ent. Mon. Mag.*, 68 : 114-115) records a Ceratopogonid attacking *Chrysopa* spp. (Neuroptera) in England, and from his remarks it is evident that the fly was distinctly visible as a black spot on the wings before the capture of the *Chrysopa*; similarly, the fly on *C. pulchellum* was distinctly visible to me at some little distance, and although Dr. Macfie's paper was already known to me, I certainly had no thought of Ceratopogonidae at the time, until I examined the dragonfly in the net. Since then I have found three or four examples, all conspicuous, on exotic Odonata, though this was when sorting them over and keeping a look-out for Ceratopogonids. It is surprising that these flies have been reported so infrequently, for although small they are quite conspicuous on the dragonflies' wings, on which part of the body they always seem to occur, and from which they are assumed to derive nourishment by piercing the veins. It is of further interest that only the females of these Ceratopogonids have been found on Odonata, the males being unknown; but Lieftinck (in Macfie, 1932) records that he once observed a pair *in coitu* on a dragonfly's wing, the male (which unfortunately escaped) being much smaller than the female. I have summarized this information not only on account of its interest, but also in order to urge collectors and students of Odonata to keep a look-out for these flies.

During the visit to Taw Marsh Mr. G. B. Gooch observed through field-glasses a Meadow Pipit with a small dragonfly, probably *Pyrrosoma nymphula*, in its beak, and also a Swift with a large object, which he thought might be a dragonfly, stuffed in its gaping beak—in this case probably *C. boltonii*.

The following prey of Odonata were noted: *Anax imperator* ♂ at Byfleet was observed suddenly to fly erratically, then more slowly high up, and on descent and capture was found to have captured a solitary wasp (which unfortunately escaped); the actions of this male were very similar to those of another which had captured a *Bombus* (recorded in Lucas, 1931, *Entomologist*, 64: 176. *Agrion splendens* ♂ eating a small Ephemeropteran, which it dropped on being disturbed by efforts to net it.

A list of species and localities follows: the characteristics of the more important of the lesser known localities are:

The streams and rivers on Dartmoor, Exmoor and Bodmin Moor are swift-flowing, but the River Taw in Taw Marsh has a small, slower stretch, almost with the character of a lowland river, where it widens at a sharp bend (here referred to as "pool"); close by in the Marsh are bog-pools with cotton grass; Rivers Exe, Teign and Allen at the points visited rapid lowland rivers, but at Thorverton the Exe also has a slow-flowing stretch above a sluice; River Culm, a smaller moderately fast stream; Grand Western Canal, Old West River, and the Fen waterways are almost stagnant, and more or less covered with floating vegetation; Bradmere Pool, Devon, is an old quarry surrounded with trees; Maiden Down, Devon, is a stretch of heather, boggy, with cotton-grass and a trickling bog-stream.

Platynemis pennipes Pall. 1935: R. Exe, Nether Exe, Devon, 6.vii, few; R. Exe, Thorverton, Devon, 11.vii, *in copula*; Lymington River, Bolderford Bridge, New Forest, 12.vii.

Pyrrhosoma nymphula Sulz. 1934: Basingstoke Canal, Byfleet, Surrey, 3.vii, few, ovipositing; R. Meavy, Dartmoor, 31.vii. 1935; R. Exe, Stuckeridge, Devon, 4.vii, 1 ♂; Sticklepath, Okehampton, Devon, 6-7, 9.vii (ovipositing); R. Taw, Taw Marsh, 1200 ft., Dartmoor, 7.vii, ovipositing; Bradmere Pool near Drewsteignton, Devon, 9.vii, *in copula*; Hound Tor and Becka Brook, Dartmoor, 9.vii; Maiden Down, Uffculme, Devon, 12.vii; Lymington River, Bolderford Bridge, New Forest, 12.vii.

Ischnura elegans Lind. 1934: R. Rhee, Grantchester, Cambs, 26.vi; Basingstoke Canal, Byfleet, Surrey, 3.vii, ovipositing; R. Rhee, Haslingfield, Cambs, 9.vii; R. Ouse, Overcote, Cambs, 10.vii. 1935: Botanic Gardens pond, Cambridge, end May; Wicken Fen, Cambs, 2.vii; Grand Western Canal, Halberton, Devon, 6.vii; R. Exe, Nether Exe, Devon, 6.vii, very few; Becka Brook, Dartmoor, 9.vii; R. Exe, Thorverton, Devon, 11.vii; Forty-Foot Drain, near Ramsey, Hunts, 17.viii; New South Eau, near Thorney, Cambs, 17.viii. ♀-f. *rufescens* Steph. 1934: Basingstoke Canal, Byfleet, Surrey, 3.vii, 1 ♀ juv. 1935: R. Exe, Thorverton, Devon, 11.vii, *in copula*. ♀-f. *infuscans* Camp. 1934:

Basingstoke Canal, Byfleet, Surrey, 3.vii, 1 ♀; R. Ouse, Overcote, Cambs. 10.vii, 1 ♀ *in copula*. 1935: Wicken Fen, Cambs, 2.vii, 1 ♀ *in copula*; Grand Western Canal, Halberton, Devon, 6.vii. ♀-f. *infuscans-obsoleta* Kill. 1935: Grand Western Canal, Halberton, Devon, 6.vii; Becka Brook, Dartmoor, 9.vii, 1 ♀ *in copula*.

Enallagma cyathigerum Charp. 1934: R. Ouse, Overcote, Cambs, 10.vii, *in copula*. 1935: R. Cam, near Upware, Cambs, 23.vi; Wicken Fen, Cambs, 2.vii; R. Exe, Stuckeridge, Devon, 4.vii, 1 ♀; Grand Western Canal, Halberton, Devon, 6.vii; R. Exe, Nether Exe, Devon, 6.vii, 1 ♂; R. Taw (pool), Taw Marsh, 1200 ft., Dartmoor, 7.vii; Bradmere Pool, near Drewsteignton, Devon, 9.vii; Hound Tor and Becka Brook, Dartmoor, 9.vii; R. Exe, Thorverton, Devon, 11.vii; Forty-foot Drain, near Ramsey, Hunts, 17.viii.

Coenagrion pulchellum Lind. 1934: R. Ouse, Overcote, Cambs, 10.vii, *in copula*. 1935: Wicken Fen, Cambs, 2.vii.

C. puella L. 1934: Charlwood, Surrey, 29.vi; Basingstoke Canal, Byfleet, Surrey, 3.vii, ovipositing; R. Rhee, Haslingfield, Cambs, 9.vii. 1935: Wicken Fen, Cambs, 2.vii?; Bradmere Pool, near Drewsteignton, Devon, 9.vii, *in copula*; Hound Tor and Becka Brook (*in copula*), Dartmoor, 9.vii; R. Exe, Thorverton, Devon, 11.vii; R. Culm, Uffculme, Devon, 11.vii; Bolderford Bridge, New Forest, 12.vii.

Lestes sponsa Hans. 1935: Wicken Fen, Cambs, 2.vii, juv.

Agriion virgo L. 1935: Sticklepath, Okehampton, Devon, 4.vii (and 11.vi.1934, G. B. Gooch); R. Exe, Stuckeridge, Devon, 4.vii, frequent, subjuv.; R. Exe, Tarr Steps, Exmoor, 4.vii; R. Taw, Taw Marsh, 1200 ft., Dartmoor, 7.vii; Becka Brook, Dartmoor, 9.vii; Blackaton Down, Dartmoor, 9.vii; R. Taw, North Tawton, Devon, 10.vii; R. Allen, between St. Kew and St. Tudy, Cornwall, 10.vii; R. Exe, Thorverton, Devon, 11.vii, very few, juv.; R. Culm, Uffculme, Devon, 11.vii, very few, juv.; Lymington River, Brockenhurst and Bolderford Bridge, New Forest, 12.vii; R. Wey, Godalming, Surrey, 14.vii, few.

A. splendens Harr. 1934: R. Rhee, Grantchester, Cambs, 26.vi; Basingstoke Canal, Byfleet, Surrey, 3.vii, few; R. Rhee, Haslingfield, Cambs, 9.vii; R. Ouse, Overcote, Cambs, 10.vii. 1935: R. Exe, Stuckeridge, 4.vii, 1 ♂; Grand Western Canal, Halberton, Devon, 6.vii?; R. Exe, Nether Exe, Devon, 6.vii, few; R. Exe, Thorverton, Devon, 11.vii; R. Culm, Uffculme, Devon, 11.vii; Maiden Down, Uffculme, Devon, 12.vii, 1 ♂; R. Wey, Godalming, Surrey, 14.vii.

Cordulegaster boltonii Don. 1934: De Lank River, Bodmin Moor, Cornwall, 27.vii. 1935: R. Taw, Taw Marsh, 1200 ft., Dartmoor, 7.vii, numerous, adult and subjuv.; R. Teign, Sandy

Park, Devon, 9.vii; Hound Tor, Dartmoor, 9.vii; Blackaton Down, Dartmoor, 9.vii; R. Allen, between St. Kew and St. Tudy, Cornwall, 10.vii; Maiden Down, Uffculme, Devon, 12.vii; Lymington River, Brockenhurst and Bolderford Bridge, New Forest, 12.vii.

Brachytron pratense Müll. 1935: Old West River near Stretham, Cambs, 23.vi; Wicken Fen, Cambs, 2.vii, ovipositing.

Aeschna juncea L. 1935: R. Taw, Taw Marsh, 1200 ft., Dartmoor, 7.vii, 1 ♂ juv.

A. grandis L. 1934: R. Thames, Oxford, 10.ix, 1 ♀ ovipositing in wooden pile, also an *Aeshna* seen flying in Oxford High Street, (Mrs. Cowley-Lake reports seeing recently a large dragonfly, probably an *Aeshna*, in Shaftesbury Avenue, London, which the passers-by were trying to kick!)

A. mixta Latr. An *Aeshna* seen by the River Mardle, near Holne, Dartmoor, 17.x.1935, may have been this species, judging from its small size; but it was very wary, and although stalked for some time I was never able to get near enough to identify it.

Anax imperator Lch. 1934: Basingstoke Canal, Byfleet, Surrey, 3.vii, ovipositing.

Cordulia aenea L. 1934: Basingstoke Canal, Byfleet, Surrey, 3.vii.

Somatochlora metallica Lind. 1934: Basingstoke Canal, Byfleet, Surrey, 3.vii.

Orthetrum coerulescens F. 1934: R. Meavy, Dartmoor, 31.vii. 1935: Taw Marsh, 1200 ft., Dartmoor, 7.vii, 1 ♂; Beeka Brook, Dartmoor, 9.vii; Maiden Down, Uffculme, Devon, 12.vii.

Libellula quadrimaculata L. 1934: Basingstoke Canal, Byfleet, Surrey, 3.vii, ovipositing. 1935: Wicken Fen, Cambs, 2.vii.

L. depressa L. 1934: Sticklepath, Okehampton, Devon, 9.vi (G. B. Gooch); R. Ouse, Overcote, Cambs, 10.vii, one pair in copula. 1935: Taw Marsh, 1200 ft., Dartmoor, 7.vii, 1 ♂.

Sympetrum striolatum striolatum Charp. 1934: R. Ouse, Overcote, Cambs, 10.vii, 1 ♂ juv.

S. danae Sulz. 1934: R. Meavy, Dartmoor, 31.vii, subjuv.

Norwood Hill House,
Horley, Surrey.

COLIAS CROCEUS IN NORTH WALES, 1935.—Whilst staying at Trearddur Bay, Anglesey, I visited friends at Criccieth on September 7th, and saw there five *C. croceus* flying on a railway embankment. A young collector had taken several specimens a few days previously. On the following day I saw another male at Trearddur Bay, Anglesey, flying over ragwort flowers.—B. H. CRABTREE; Highfield, Trafford Road, Alderley Edge, Cheshire, May 25th, 1936.

MIGRATION RECORDS, 1936.

BY CAPT. T. DANNREUTHER, R.N.

PERHAPS due to cold weather on the Continent, early 1936 records of migrant Lepidoptera have been unusually scarce, as is indicated in the following notes received.

(1) *Records of Insect Movement.*

(1) April 25th. *Vanessa atalanta*: At Slough, Bucks, 30 to 40 were seen flying S.E. over the High Street at 10.30 a.m., a warm showery morning. The species was identified by an entomological dealer, to whom a local boy reported that he had seen them flying out of an alcove over a boiler-room (*Entom.*, 69 : 131).

(2) May 10th. *Gonepteryx rhamni* (resident species): On the moor above Tavistock, Devon, in a N.N.W. wind during the afternoon 14 specimens were counted in an hour during the afternoon all flying east in a procession at intervals (J. L. Palmer).

(3) May 19th. *Pieris brassicae*: Near St. Malo, Ile-et-Vilaine, France, between 11 a.m. and noon, Monsieur René Oberthür, Hon. F.R.E.S., witnessed a fairly large number flying singly, against a light wind, crossing the harbour in a north-east direction from St. Lunaire towards Normandy. They appeared over the Pointe du Decollé, and were lost to sight over St. Malo (letter to Hon. Sec.).

(4) May 18th, 19th. *Plusia gamma*: At Hastings, along the seashore between 11 p.m. and 0.30 a.m., a swarm appeared of which over 50 were counted at a time resting round the lights of the covered parade and had all gone by 9 a.m. Six were taken from those resting, and released away from lights shortly afterwards; of these five flew due North, and the other settled on a light. It was a warm moonless night (temp. 68° F.) after a sunny day with light northerly airs. Not more than three specimens had been seen here on previous nights or since, the first appearance being noted on June 7th (H. G. Macleod).

(5) May 25th. *Plusia gamma*: In Leicester City at night a great many appeared unexpectedly fluttering round electric light standards. Six captured were subsequently released away from lights, and all flew to the eastwards (B. Vasey-Fitzgerald).

(2) *Other Early Appearances, 1936.*

Vanessa cardui: A solitary male specimen flew into a shop window at St. Mary's, Scilly Isles, at 3 p.m. on January 17th, when there was a strong N.E. wind with hail showers. The insect was taken in a semi-comatose condition, and sent to Harpenden, where

it was kept under outdoor conditions, which included snow, and died without further flight on January 29th (R. Trotter and Mrs. K. Grant) (*Entom.*, 69 : 63).

As a worn specimen was reported at Mycenae, Greece, on April 17th (Miss Kaye-Smith) a migration was anticipated, but none have been reported in the British Isles except two in the Isle of Man seen flying along the cliffs at Peel on the afternoon of May 28th (G. Clementson).

Vanessa atalanta : No records December to February. On March 10th 3 faded specimens seen at Glengariff, co. Cork (J. E. Flynn), and one at Sevenoaks (*Entom.*, 69 : 94); later 7 others recorded at Hastings, Walmer, Glengariff and Rock Ferry (Ches.). April records are 10th, 2 near Greeba, I. of Man; 28th, 2 at Hastings, Downfield (Glos.), Morpeth, and 30th Birtley (Durham). In May, 6 at Hastings, 3 at Stroud (Glos.), Ashburton (Devon), Birtley and Flamboro' Head. June 4th 1 at Langness, I. of Man. See also (1) above.

Control insects first reported out of hibernation : *Aglais urticae* on March 1st at Paignton, Devon, and *Nymphalis io* on March 18th at Hastings, Sussex. Both rather scarce in spring.

Colias croceus : May 17th, 2 seen at Hastings (D. Brightmore).

Macroglossum stellatarum : April 29th, 1 at Hamsterley, near Bishop Auckland, Durham (J. Grunwell); and 2 on May 19th seen at Flamboro' Head at Bogbean flowers, *Menyanthes trifoliata* (C. W. V. Gane).

Plusia gamma : Not recorded in any stage during the winter. First appeared simultaneously at Timoleague, co. Cork, and Hastings on May 7th. The 2 taken on the 7th by Mrs. G. E. Lucas showed no ova, but two others, also taken at Timoleague on the 11th, were in fair condition and full of ova (Lt.-Col. C. Donovan). Other May records are 11th and 16th, Stroud (Glos); 17th, Rudgwick (Surrey), 7 at Farley (Wilts), Woodeaton (Oxon), Exmouth, Winsford Common (Exmoor); 18th, Chelmsford; 19th, Oxford; 20th, Slough; 22nd, Llanidloes (Mont.); 25th, Harpenden. See also Section (1) above.

Plutella maculipennis Curt. : May 21st, at Stroud (Glos), and about May 22nd, at Newcastle.

(3) Appearance of Migrants in France, 1936.

For comparison the following records received from Mrs. V. M. Muspratt, Curator of Bayonne N.H. Museum, show a corresponding spring scarcity on the Continent.

At St. Jean-de-Luz, Basses Pyrénées : January 12th, first single specimens of *V. atalanta* and *M. stellatarum*; February 17th, *N. io*; 19th, *A. urticae*; 20th, *Leucania unipuncta* Haw.; March 14th,

P. gamma fresh at Cannes (de Blanlieu) ; 18th, *Nomophila noctuella* Schiff. with *P. gamma* ; April 3rd, *N. antiopa* (Miss F. Twemlow).

At Andernos, Gironde : April 5th, *N. noctuella* (S. le Marchand).

At Bovée-sur-Barbaure, Meuse : May 17th, *C. hyale* (Jean Monilleron).

At Cauterets, Hautes Pyrénées : May 18th, *N. antiopa* (Mrs. V. M. Muspratt).

(4) Notes.

A second edition of the British Museum booklet, Set E 57, *British Immigrant Butterflies and Moths*, with text revised by Dr. C. B. Williams, F.R.E.S., was issued in April, accompanied by a sample Migrant Insect Record card amended to suit the needs of foreign observers. The South-eastern Union of Scientific Societies issue a new list of Recorders in Bulletin No. LXVII (copies free from the writer). The new list of Immigrant Insects for Recording requests both *A. urticae* and *M. io* to be observed for numbers present daily to act as "control" ; otherwise there is no change except the withdrawal of a few rare vagrants not illustrated in the booklet.

As many inland districts are now under the supervision of the Provincial Advisory Entomologists, appointed by the Ministry of Agriculture and Fisheries, a more reliable series of observations is hoped for ; whilst on the coasts, the addition of selected lighthouses, administered by the Commissioners for Northern Lights and the Irish Lights Board, at which permanent watch is kept, should ensure early reports of immigration being received. The first specimen received from these new volunteers was a fine male *Saturnia pavonia* taken on May 4th at John o' Groats Post Office, probably locally bred, and sent in by the Light-keeper at Duncansby Head, Caithness.

" Windycroft,"

Hastings.

EUPROCTIS CHRYSORRHOEA IN ESSEX.—On May 30th, 1936, I found a number of larvae of this insect feeding on a hawthorn bush in a lane about 200 yards from the seashore at Dovercourt, Essex. I thought this might prove of interest in view of the fact that this insect is supposed to be more or less confined to the coasts of Kent and Sussex.—H. E. CHIPPERFIELD ; " Dorowyn ", Fronks Road, Dovercourt, Essex.

THE TYPE LOCALITY OF CHIONASPIS ASPARAGI, LAING AND COCKERELL.—This species was described (1929) with no better locality than Natal. I have now ascertained from the collector that the type locality is Umzumbi, 16 miles N.E. of Port Shepstone.—T. D. A. COCKERELL.

BRITISH LEPIDOPTERA COLLECTING, 1935.

By C. G. M. DE WORMS, PH.D., F.R.E.S.

(Concluded from p. 135.)

Collecting at the end of August was none too productive owing to a series of wet spells. However, an evening visit to the Chilterns on the 20th once more yielded quite a number of larvae of *Lophopteryx cuculla* of all sizes feeding on small maple trees, while an outing to the heathland near Camberley on the 26th produced a few *Noctua castanea*.

I spent the second portion of my holiday in Cornwall, travelling to Mullion on the night of the 28th. I had quite a profitable week's sojourn in these favoured haunts, though the weather was for the most part extremely unpropitious. Night collecting was carried out on the cliff's edge in the vicinity of one of the hotels. *Polia xanthomista* was beginning to appear, and several of this local insect turned up at sugar on the 29th, still more on the 31st, while on September 2nd, when Mr. A. M. Morley joined me, we saw some fifteen. I was surprised to find *Lithosia caniola* still about. This species was to be found at rest just after dark on bushes and grass-stems always perilously near the sheer edge of the cliffs. Another interesting visitor to sugar was *Agrotis obelisca*, still in fresh condition. August 31st was the best night for light. *Epineuronia popularis* and *Apamea testacea* swarmed on the sheet. I also took several *Tholera cespitis*, and one female example of the very dark form of *Bombyx trifolii* which laid well. On September 2nd the only visitor to light was an *Agrotis lucerneae*. By day there were quite a number of *Colias croceus* to be seen, but I only obtained a single f. *helice*. *Vanessa cardui* was apparently very scarce. On September 1st I made a journey to the coast near the Lizard. I happened to find a patch of *Silene maritima* completely shrivelled. Feeding in the roots of each plant were two or three of the insipid-looking larvae of *Dianthoecia barretti*, which fed up well and all subsequently pupated.

I revisited Kent on September 6th. *Lysandra bellargus* was now well out and in better numbers than in 1934. On a further trip to Dungeness on the 7th there was a good assortment of insects on sugar. Among these were a few rather worn *Leucania albipuncta* and some very fresh *Caradrina ambigua*. I made a tour of east Kent on the 8th, but could see no sign of *Colias hyale* in several localities where it had been comparatively numerous in the previous season. On September 13th I paid an evening visit to the Essex Marshes, and found larvae of *Euchloris smaragdaria* fairly plentiful on the sea-wormwood. My next week-end expedition on the 15th took me once more to Swanage, where night

collecting was by no means unproductive. On the downs *Heliophobus hispidus* was in good numbers at rest on short grass-stems shortly after dusk. Females of this species were in a good proportion. On sugar *Aporophyla australis* was just starting to appear, while the heathland near the sandhills yielded a few *Agrotis vestigialis* and several *A. agathina*, somewhat worn. The next day was too wet and stormy for any profitable collecting until the evening, when I called on Mr. Andrews at Bere Regis and obtained at sugar a few fresh *Aporophyla lutulenta* and *Caradrina ambigua*. During the subsequent week I also took *A. lutulenta* near Esher, in the Camberley district and in the garden here—all localities where I had never seen this insect before.

I was again in the Folkestone area on September 21st. Romney Marsh was the objective of a good many collectors on that night. Sugar was fairly well patronized by a great many *Agrotis ypsilon* and *A. segetum*. The main captures of the evening were several *Leucania vitellina*, just emerging. On the next night three more of this insect were taken, as well as a good many *Aporophyla australis*. On the way home in the West Kent woods I took a few *Palimpestis diluta* and *Tholera cespitis*.

On September 28th I joined Mr. Wightman in the Arundel area and had quite a good evening in the beech woods, where we secured a nice and variable series of *Xanthia aurago* on sugared twigs and at ivy. *Amathes macilenta* and *Calocampa vetusta* were beginning to appear.

The autumn collecting of 1935 proved much better than for many years. One of the chief features particularly in this district was the remarkable abundance of *Aporophyla nigra* from early October onwards. It also turned out to be a "year" for *Orrhodia rubiginea*. I obtained quite a nice series of *A. nigra* in the Woking neighbourhood on October 1st, as well as a good many *Amathes helvola*. *O. rubiginea* began to emerge in the same locality on the 3rd. On the 5th I made a week-end journey to the New Forest. My only capture that night was a solitary *Leucania lutosa* far from any marshy ground. The following morning in brilliant sunshine *Polygonia c-album* and *Vanessa atalanta* were in plenty on decaying apples in the local gardens.

I took a few *Lithophane semibrunnea* here between October 10th and 15th, and on visits to the Hog's Back on the 14th and 19th I found several *Thera juniperata* at rest on the juniper bushes. On the 27th I was in the Cotswolds, but I met with only common species, together with a very dark form of *Orrhodia vaccinii*. *Aporophyla nigra*, *Agriopsis aprilina* and *Orrhodia rubiginea* were still appearing in quite fresh condition at the end of October in the Bagshot sand area.

During early November I made several journeys to the downlands of Surrey, Hants and Bucks in search of *Ptilophora plumigera*, but my efforts met with no success until the 10th, when I motored to Wye, Kent, on a very unpropitious-looking moonlit night. My only visitor to the sheet was a fresh male example of this species at about 7 p.m.

During the latter part of the month *Poecilocampa populi* and *Himera pennaria* were fairly numerous, whereas the *Cheimatobias* and *Hybernias* were much scarcer than usual, *H. defoliaria* being comparatively uncommon.

In summary it would seem to be the general opinion that the year 1935 was in many ways a less profitable collecting season than its two predecessors, both for numbers and variety of insects. There can be little doubt that the great frost of mid-May had a profoundly adverse influence on many insects, especially on those whose larvae had just hatched. One of the chief features of the season in respect to the Butterflies was the gratifying reappearance in many districts of *Nymphalis polychloros*. 1935, however, can hardly be said to have been a first-class year for the immigration of Lepidoptera. There was no great invasion of the characteristic migratory insects, while there were extremely few records of the arrival in this country of any of the rarer species of moths. Taken as a whole, 1935 will stand out as a disappointing year.

Milton Park,
Egham, Surrey;
January, 1936.

SECOND BROOD ERYNNIS TAGES.—While collecting insects in the Isle of Wight during the earlier part of August, 1933, I took seven specimens of the Dingy Skipper Butterfly (*E. tages*) on a sheltered part of the cliff near Culver Cliff in Sandown Bay. I caught them on the twelfth of the month, although I had not noticed any other specimens during a number of visits to the same place within the previous fortnight.—DOUGLAS M. MOLLISON; 67, Earlsfield Road, Wandsworth, S.W. 18.

EPESTHIA LARVAE EATING DEAD LARVAE OF THEIR OWN SPECIES.—Whilst collecting larvae of *Ephestia cautella* Wlk. the larvae were put, without any food, in a tin. When opened some days later it was found that the numbers were not the same as those originally put in, although the tin was sealed so that none could escape. Examination showed a number of larvae had evidently been injured and had died. These had in some cases been consumed by the living larvae. Newly hatched larvae will feed on the bodies of dead moths, but this is the first time I have observed larvae consuming the shrivelled bodies of dead caterpillars.—RAYMOND V. WADSWORTH; 128, Bunbury Road, Northfield, Birmingham.

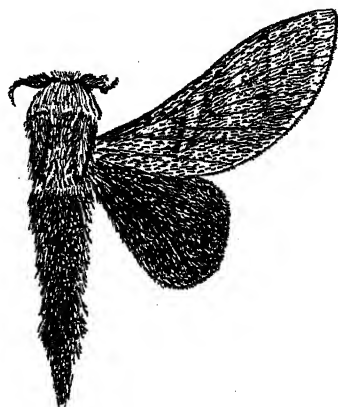
A NEW SPECIES OF AFRICAN LASIOCAMPIDAE
BELONGING TO THE GENUS *PACHYPASA*
WALKER 1855 (LEPIDOPTERA).

By W. H. T. TAMS.

(Published by permission of the Trustees of the British Museum.)

Pachypasa madelineae sp. n.

♂. Palpus vinaceous cinnamon shaded with vinaceous brown. Antenna honey yellow, the shaft clothed with vinaceous brown scales. Head and thorax vinaceous brown mixed with snuff brown and vinaceous cinnamon. Abdomen tergally vinaceous brown. Pectus, legs and venter vinaceous cinnamon shaded with vinaceous brown. Fore wing snuff brown, in places tinged with vinaceous brown, and with vinaceous buff irroration forming hardly noticeable, roughly parallel fasciae and a diffuse patch on termen near the wing apex; fringe vinaceous brown. Hind wing vinaceous brown, at the base vinaceous cinnamon, the distal fourth shaded with chocolate. Underside of both fore and hind wings vinaceous cinnamon to vinaceous brown, distally shaded with fuscous.



Pachypasa madelineae sp. nov. ♂.

Expanse: 48 mm.; fore-wing length, 22 mm.

Holotype ♂. French Congo, Ubangui-Chari Territory, Alindao,
30.xii.1934 (R. F. Johnstone).

NOTES ON BRACONIDAE: XV.—MICROGASTERINAE.

BY CLAUDE MORLEY, F.R.E.S., F.G.S., F.Z.S.

(Continued from p. 142.)

76. *A. popularis*, Hal.—Bred copiously from *Euchelia jacobaeae* at Tuddenham in Suffolk, 1916 (B. S. Harwood).

77. *A. pallidipes*, Reinh.—Twenty-one ♂♂ and some 60 cocoons, set on end upon a stem of *Galium verum*, with an evacuated chrysalis of some *Lissonotid* ichneumon, and a single ♀ of the hyperparasitic ichneumon, *Mesochorus pictilis*, Hlmgr., were bred in autumn of 1900 from larvae of *Anticlea cucullata*, Hfn., taken in south Devon the previous August (Bankes). Raised from *Triphaena fimbria* in New Forest about 1916 (Lyle); and from *Leucania lithargyrea*, Esp., at Shaldon in Devon on March 27th, 1908 (Rupert Stenton). Captured in Isle of Wight (Morey); at Reigate in Surrey (Saunders); Tuddenham Fen in Suffolk in mid-June, 1908 (Elliott), and several at Brandon there about the same period.

78. *A. bicolor*, Nees.—Lyndhurst in the New Forest as early as April 16th (F. C. Adams); Reigate (Saunders) and Shere (Capron) in Surrey; swept singly in Suffolk in Tuddenham Fen during June, and the Southwold salt-marshes from reeds in both August, 1900, and September, 1914.

79. *A. formosus*, Wsm.—“Among insects sent by J. Lichtenstein from Montpellier is a ♀, with its pedunculated cocoon, transfixed by the same pin” (Marshall's MS.) (cf. *Ent. Mo. Mag.*, 1906, p. 275).

80. *A. lautellus*, Msh.—Two ♀♀ and 3 cocoons, bred in Norfolk, 1910 (Campbell-Taylor); 6 and 8 cocoons, with the shrunk larva of *Diloba caeruleocephala*, whence they emerged at East Grinstead in Sussex during 1908 (Slater); I have a blown larva of this moth from Ipswich, with three such cocoons still attached to its skin. Captured in the New Forest during July, 1909 (Adams); and at Walberswick in Suffolk on September 5th, 1910.

81. *A. unbellatarum*, Hal.—An excellent example of both simple and compound parasitism in the same species of Hymenopteron is furnished by Marshall's MS. note in his copy of *British Braconidae*, p. 220: “J. H. Wood bred a ♀ from *Lithocolletis spinicolella*, Kol., and one other from *Elachista gleichenella*, F. Bignell bred 150 specimens from a larva of *Arctia villica*, L.”

82. *A. fraternus*, Rnh.—Forty of both sexes and a flocculent subcircular bundle of cocoons bred at Camberley in Surrey on September 5th, 1917, from ? *Euclidia mi* (E. E. Green). Half a dozen from Surrey (? Largel Marsh, illegible: Capron).

83. *A. triangulator*, Wesm.—“Bred in Devon by Bignell who

raised it from half-grown larva of *Dasychira pudibunda*, L." (Marshall's MS.). Single ♀♀ captured at Greenings in Surrey (Saunders) and Felden in Herts (Piffard).

84. *A. callidus*, Hal.—Shere in Surrey (Capron). Twelve ♂♂ and about as many cocoons, with the evacuated one of a small *Campoplegid* ichneumon, and 2 hyperparasitic *Pezomachus instabilis*, Fst., ♀♀, all bred together in autumn of 1900 from Geometrid larvae collected the previous August about Dartmouth in Devon (Bankes); 9 ♀♀ and the cocoons whence they emerged, found June 27th, 1908, on a grass-stem in paddock at Monks Soham, where the species occurs also on umbell-flowers, as well as in Winston marshes, during August.

85. *A. lateralis*, Hal.—A ♂ from Devon (*ex coll.* Bignell), a ♀ from Felden in Herts (Piffard) and another on house-window at Monks Soham, Suffolk, July, 1919.

86. *A. vitripennis*, Curt.—I swept a single ♀ at Marvell Copse in Isle of Wight on June 25th, 1907.

87. *A. fulvipes*, Hal.—"Bred by Dr. Corneille Chyzer at Ujhely, Hungary, on December 28th, from *Spilosoma fuliginosa*, L." (Marshall's MS.; whence, doubtless, his unlocalized record from this host in *Spp. Hym. d'Europ.*, 1 : 486); 7 ♀♀ and 34 cocoons bred from *Toxocampa craccae* at Withycombe near Taunton, Somerset, in July, 1907 (Slater); 15 ♀♀ and a bundle of cocoons on nettle-leaf at Cheltenham; also 29 of both sexes and as many cocoons, which were the total exclusion of the annexed shrunken larva of *Triphaena pronuba*, bred at Rodborough in Glos. on April 9th, 1914 (C. G. Clutterbuck). Common on the wing: Reigate in July, 1872 (Saunders), and Shere (Capron) in Surrey; Dalkey, near Dublin, July, 1913; Haven Street and Norton Woods in Isle of Wight, June, 1907; Guestling Wood, near Hastings, July, 1909, with Rev. E. N. Bloomfield; West Leake in Notts, July, 1914; Brandon staunch and on Monks Soham House windows, May and June.

MICROPLITIS, Förster.

Verh. pr. Rheinl., 1862, p. 245.

Table of Species.

- (22) 1. Basal segment less than $1\frac{1}{2}$ times longer than broad,
not contracted towards its broadly rounded apex.
- (7) 2. Segment 2 coriaceous or rugose, dull; wings infumate.
- (6) 3. Stigma basally white; tegulae piceous.
- (5) 4. Hind tarsi nigrescent or most distinctly infusate
 - 1. *spinolae*, Nees.
- (4) 5. Hind tarsi entirely testaceous throughout
 - 2. *xanthopus*, Ruth.

- (3) 6. Stigma hardly paler basally; tegulae always flavous
3. *fumipennis*, Ratz.
- (2) 7. Segment 2 glabrous and nitidulous, shining; wings
usually hyaline.
- (9) 8. Basal segment also always glabrous and nitidulous
4. *ocellatae*, Beh.
- (8) 9. Basal segment punctate-rugulose and dull.
- (17) 10. Hind femora invariably more or less broadly black.
- (12) 11. Stigma subunicolorous; hind tibiae half flavous
5. *vidua*, Ruth.
- (11) 12. Stigma bicolorous, *i. e.* definitely pale basally.
- (14) 13. Wings subhyaline; tibiae totally fulvous
6. *spectabilis*, Hal.
- (13) 14. Wings always distinctly infumate throughout.
- (16) 15. Tibiae red; ♀ antennae only $\frac{3}{4}$ length of the body
7. *tristis*, Nees.
- (15) 16. Tibiae paler; ♀ antennae longer than $\frac{3}{4}$ of body
8. *dolens*, Msh.
- (10) 17. At most extreme apices of the red femora black.
- (19) 18. Mesonotal notauli deeply impressed; postpetiole
apically truncate 9. *sordipes*, Nees.
- (18) 19. Mesonotal notauli not deeply impressed; postpetiole
apically rounded.
- (21) 20. Postpetiole apically semicircular; notauli superficial
10. *eremita*, Reinh.
- (20) 21. Postpetiole gently rounded; notauli utterly wanting
11. *strenua*, Reinh.
- (1) 22. Basal segment twice longer than broad, narrow and
lanceolate towards apex.
- (24) 23. Antennae more or less rufescent, at least below
12. *mediator*, Hal.
- (23) 24. Antennae entirely nigrescent or black throughout.
- (28) 25. Hind femora always for the most part black; scutellum
nitidulous.
- (27) 26. Wings narrow; metathorax roughly punctate
13. *adunca*, Ruth.
- (26) 27. Wings normal; metathorax roughly reticulate
14. *borealis*, Msh.
- (25) 28. Hind femora rufescent; scutellum densely punctate
and dull.
- (30) 29. Segment 2 coriaceous; head and mesothorax clear red
15. *alvearia*, Fab.
- (29) 30. Segment 2 smooth; head and thorax entirely black.
- (32) 31. Stigma basally broadly pale; segment 2 laterally
flavous. 16. *mediana*, Ruth.
- (31) 32. Stigma pale-dotted only; segment 2 entirely black
17. *tuberculifera*, Wsm.

NEW DRYOPIDAE FROM THE JAPAN EMPIRE
(COLEOPTERA).

BY HOWARD EVEREST HINTON.

(Zoological Laboratory, Cambridge.)

IN the following paper one genus and two species of Dryopida are described as new. The new genus, *Dryopomorphus*, is noteworthy in being the first genus of the subfamily Larinae to be recorded from Japan. For the opportunity to dissect and describe the new genus and species from Japan I am indebted to Mr. G. J. Kerrich, Curator of the University Museum of Zoology, Cambridge. For the new species from Formosa my thanks are due to Mr. J. Linsley Gressitt of Berkeley, California.

***Helichus gressitti*, sp. n.**

Female.—Length, 6.5 mm.; breadth, 2.2 mm. Subparallel, moderately convex. Dorsal and ventral surface clothed with fine, short (about .025 mm. long), mostly recumbent, moderately dense, brownish-testaceous hairs and also with similar but longer (about .12 mm. long), usually erect, sparser hairs; eyes moderately densely clothed with these longer, erect hairs. Cuticle strongly shining, black to very dark rufo-piceous; apical segments of antennae, mouth-parts and legs paler rufo-piceous.

Head without distinct impressions; anterior clypeal margin very feebly rounded, nearly truncate; anterior margin of labrum broadly and very feebly arcuately emarginate at middle. Surface with two sizes of nearly round to round punctures as follows: coarser punctures nearly .025 in diameter or nearly as coarse as facets of eyes, and separated by less than to two times their diameters; finer punctures about a third as large, and separated generally by less than to two times their diameters.

Prothorax at broadest point which is across basal angles one-third broader than long (1.91 mm. : 1.32 mm.) and base broader than apex (1.91 mm. : 1.37 mm.). Apical margin as seen from above very feebly, arcuately emarginate for its entire breadth. Apical angles not prominent, feebly deflexed and feebly acute; sides feebly arcuate, converging moderately towards apex, lateral margins not crenate; basal angles moderately prominent, feebly acute and feebly produced backwards; base trisinate, broadly and rather deeply so on each side, more narrowly and much more shallowly so in front of scutellum. Pronotum moderately evenly and strongly convex, without impressions of any sort. Surface of pronotum punctate as head, but with the coarser punctures about a fourth coarser and not quite so dense, and the finer punctures equally fine, but sparser, being often separated by more than two times their diameters.

Elytra more than three times as long as prothorax (4.5 mm. :

1.32 mm.), nearly subparallel, and broadest point at apical half (2.2 mm.) only slightly broader than broadest point near humeri. Humeri feebly gibbous. Lateral margins not crenate. Surface with the striae nearly a third as broad as sutural interval at base, but becoming finer towards apex; discal striae punctures round to subquadrate, generally about a third as coarse as sutural interval at base, but becoming finer towards apex and usually separated longitudinally by less than to one times their diameters. Intervals nearly flat; surfaces punctate similarly to head, but with the coarser punctures not quite so evident. Scutellum nearly flat, subovate, broader than long (.45 mm.: .35 mm.); surface sculptured as adjacent elytral intervals.

Prosternal process nearly as long as remainder of prosternum, acutely pointed at apex, and with a moderately convex elevation extending from apex and gradually becoming more feeble towards base, but still visible opposite middle of coxae; surface and surface of hypopleura punctate, somewhat similarly to head. Metasternal disk with a moderately broad, longitudinal line extending from base to apex; surface of disk and sides punctate as prosternum. Abdominal segments punctate as prosternum, but with the fine punctures generally sparser; towards sides of segments the surface becomes feebly rugose. Legs punctate as prosternum. Genitalia of the asymmetrical type common to the species of *Dryops*.

Male unknown.

Type: A female in the author's collection. Formosa: Rokki, 15.vi.1932 (L. Gressitt).

The new species differs from the only other described *Helichus* from Formosa, *H. dicksoni* Ch. Waterh. (1878), in the following readily observable characters: (1) size smaller than *dicksoni* (6.5 mm.: 8 mm.); (2) dorsal and ventral surface not tuberculate instead of generally moderately densely tuberculate; (3) pronotum much more strongly convex; and (4) lateral margins of prothorax much less strongly flexed upwards.

Dryopomorphus, gen. n.

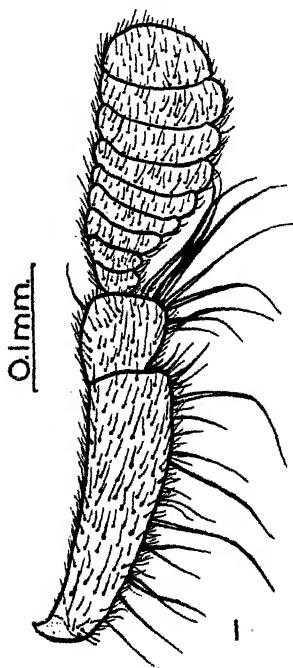
(Text-figs. 1 and 2.)

Feebly obovate, nearly subparallel, moderately convex. Head partially retractile; antennae 11-segmented (Text-fig. 1), very broadly separated at base; mandibles with three acute, apical teeth, protheca large, well developed, membranous throughout, and at apex and along mesal margin with numerous extremely fine teeth; maxillary palpi 4-segmented (Text-fig. 2); eyes very broadly separated, without hairs. Pronotum with a sublateral sulcus on basal one-third; without distinct transverse impressions; with only a broad, very feeble, longitudinal impression on disk. Elytra finely and deeply punctate striate; intervals moderately convex. Scutellum subovate. Prosternal process slightly longer than prosternum at

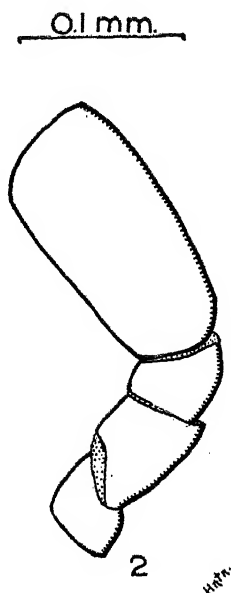
middle, very broad and at apex obtusely angulate. Metasternal disk with a medium longitudinal, impressed line. Legs moderately short; tibiae at apices with a fringe of tomentum on inner surfaces; claws short, scarcely longer than fourth tarsal segment. Female genitalia of the usual bilaterally symmetrical, stylet-bearing type found in this subfamily.

Genotype : *Dryopomorphus extraneus* Hinton, sp. n.

This genus belongs in the subfamily Larinae, and from all the genera of this subfamily it may be separated by the different structure of the prothorax, elytral intervals and prosternum. In general appearance the genotype closely resembles certain species of the genus *Dryops*.



TEXT-FIG. 1.—Antenna of *Dryopomorphus extraneus*, Hinton.



TEXT-FIG. 2.—Maxillary palpus of same.

Dryopomorphus extraneus, sp. n.

(Text-figs. 1 and 2.)

Female.—Length, 4.9 mm.; breadth, 2.05 mm. Feebly obovate, moderately convex. Clothed on dorsal and ventral surface with very dense, fine, short (about .012 mm. long), recumbent, brownish-testaceous hairs and also more sparsely clothed with similar, but

longer (.05 mm. to .1 mm. long), nearly erect and sparser hairs; head and prothorax with the very fine hairs slightly denser than elsewhere. Cuticle feebly shining, moderately dark rufo-piceous.

Head on each side near eyes with a very feeble, broad, longitudinal impression, elsewhere without distinct impressions; clypeus with anterior margin very feebly and broadly arcuately emarginate. Labrum with the anterior margin moderately broadly and very feebly arcuately emarginate. Surface with two sizes of nearly round, microscopical punctures as follows: coarser punctures generally about .01 mm. in diameter and usually separated by less than to nearly two times their diameters; finer punctures about a fifth as large and equally as dense.

Prothorax across broadest point which is just in front of base one-third broader than long (1.75 mm. : 1.17 mm.) and base broader than apex (1.70 mm. : 1.00 mm.). Apical margin as seen from above evenly, moderately feebly, arcuately emarginate for its entire breadth; apical angles not prominent, obtuse, rounded; sides feebly and nearly evenly arcuate, converging moderately towards apex, lateral margins not crenate; basal angles not prominent, nearly rectangular; base trisinate, broadly and deeply so on each side and more narrowly and slightly more feebly sinuate in front of scutellum. Pronotum rather strongly and somewhat transversely convex; on each side at a distance from the lateral margin equal to breadth of scutellum with a deep, longitudinal sulcus which extends forwards from base and gradually becomes less distinct and shallower, disappearing at apical two-thirds; on disk extending from base to apex is a median, very shallow, moderately broad and somewhat indistinct impression. Surface of pronotum punctate similarly to head, but with the coarser punctures slightly finer and sparser.

Elytra obovate with the greatest breadth at basal half and more than twice as long as prothorax (3.00 mm. : 1.17 mm.). Humeri not gibbous. Lateral margins not crenate. Surface with the striae deep and about one-thirteenth as broad as sutural interval; discal striae punctures round, scarcely broader than striae and generally separated longitudinally by three times their diameters. Intervals moderately convex, but with the alternate intervals (except sutural at base) broader and slightly more strongly convex; surface of intervals feebly, microscopically alutaceous and punctate as pronotum, but with the punctures slightly sparser. Scutellum subovate, very feebly convex and broader than long (.32 mm. : .26 mm.); surface punctate as pronotum.

Surface beneath punctate nearly everywhere as on pronotum. Prosternal process with a broad, feebly convex, longitudinal elevation from base to a little beyond middle of coxae. Mesosternum with the inner sides of the coxal cavities strongly raised. Metasternum with a moderately broad and deep, median longitudinal impression extending from apex to base; surface of sides with only a few of the coarser punctures. Basal abdominal segment with a moderately broad, carina-like elevation extending on each side of middle to

nearly apex of segment; laterally to apex of this carina is a large (about .17 mm. across), deep, oval, obliquely transverse pit. Legs moderately short; claws scarcely longer than fourth tarsal segment, rather feeble for this family.

Male unknown.

Type: A female in the collection of the University Museum of Zoology, Cambridge, Japan, 1913.

NOTES AND OBSERVATIONS

CIMBEX FEMORATA IN CROYDON.—Since the late Edward Step, in his *Handbook of British Hymenoptera*, mentions that the birch sawfly (*Cimbex femorata*) is rare in this country, it may be of interest that I picked up a fine female of this species in South Croydon on May 28th of this year.—E. H. WILD; 21, Normanton Road, S. Croydon.

[Mr. R. B. Benson tells me that in his experience *Cimbex femorata* is a widely distributed and probably common species over the whole of Britain. He constantly comes upon the larvae when beating birch, but as the adults fly high they are not so frequently noticed.—ED.]

PAPILIO MACHAON IN KENT.—I saw a perfect specimen of *P. machaon* in the middle of the golf-links at Littlestone, Kent, last Sunday morning. It was flying in its usual placid way, continually alighting on flowers on the ground, and I was able to watch it closely for some minutes. It is thirty-seven years since I last saw one flying—at Wicken Fen.—The Rt. Hon. LORD JUSTICE SCOTT; 20, Egerton Terrace, S.W. 3, May 20th, 1936.

AN OBSERVED IMMIGRATION OF BUTTERFLIES AT STUDLAND BAY, DORSET.—For a few days prior to September 5th, 1935, the weather had been very hot with a slight and sometimes fairly strong S.S.W. wind. I had been down on the beach midway between Sandbanks and Studland for several days running, but did not see an insect at all until September 5th, which was a hot day, but became colder about 3.30, when a strong S.W. wind started blowing. Just about this time I saw a *Colias croceus* flying strongly due west, and watched it out of sight. Then I saw two more. This looked likely to be interesting, so I looked about for others and saw quite a few more, including one or two *Pieris rapae* and one *Vanessa cardui*, within a half-hour of seeing my first. By 5 o'clock p.m. the wind died down a little and I had seen approximately 50-60 *C. croceus*, 50 *P. rapae*, 12 *V. cardui*, 6 *V. atalanta* and 3 *A. urticae*. I think all must have been immigrants, because I had spent a good deal of time on that particular part of the beach before and after and did not see another insect, even when weather conditions were the same. When the insects, which could be seen coming in over the sea, reached the shore (from the eastward), they did not fly direct (to W.) inland, but flew

(N. and S.) up and down over the sands for several long flights, but not very fast. They could be easily netted, at least all except *C. croceus* and *V. cardui*. After a while they made off inland (W.). *C. croceus* went right away; the Vanessas, however, lingered about on the heather which was near. *P. rapae* distributed themselves inland. The condition of the insects which I was able to examine is as follows: 19 *C. croceus* fair; 22 *P. rapae* good; 2 *V. cardui* poor; 1 *V. atalanta* fair. I did not take any *A. urticae*. I was surprised at the speed with which *P. rapae* came in—much faster than the normal flight. *A. urticae* was the last to arrive and very slow. *V. cardui* almost as fast as *C. croceus* and *V. atalanta* about ordinary. Roughly the duration of the migration lasted from 3.30 until 5.30 p.m.—C. M. R. PITMAN; 39, Rampart Road, Salisbury, Wilts.

VANESSA CARDUI MIGRATION IN UNITED STATES, 1935.—F. Martin Brown, F.R.E.S., writes that on March 27th, 1935, between Lordsburg, New Mexico, and Coolidge, Arizona, he motored through a dense cloud of *V. cardui* for some five hours. Later in the spring, May 10th, the swarm descended in Colorado Springs, Colorado. The following day he estimated the numbers there at about 20,000 per acre on lawns, at 8000 per acre in alfalfa fields and at 100 per acre on the open prairie. He noted in his journal: "This is probably the migration noted on March 27th. If so, they must have travelled some 580 miles in 44 days and, incidentally, crossed two mountain ranges topping 9000 feet." (Extract from letter from Colorado Biological Survey dated April 26th, 1936, addressed to Capt. T. Dannreuther, R.N., "Windycroft", Hastings.—ED.)

COSMOPHILA SABULIFERA IN KENT.—I captured last autumn, at sugar in my own orchard, a specimen of *Cosmophila sabulifera* ab. *bipuncta* (Warren), which is an inhabitant of N. Africa, Japan, Malay and Australia. Dr. Bull, when looking over my collection recently, expressed much interest in this specimen, and very kindly took it for identification with the above results. I can only imagine the insect arrived in some produce from one of these countries. No possible confusion of specimens can have arisen, as when setting the insect I could in no way identify it and told my wife at the time.—T. R. H. SMYTH (Capt.) (retd.); Little Orchard, Goudhurst, Kent.

RECENT LITERATURE.

Applied Entomology. By H. T. FERNALD. McGraw-Hill Publishing Co., Ltd., 1935. Pp. x + 405. 384 figs. Price 21s. net.

This is the third edition, brought up to date and largely rewritten, of the well-known work by Prof. Fernald, first published in 1921. Though primarily intended for American students, the book will be found useful to workers throughout the British Empire, inasmuch

as it gives both a lucid account of the important insects of the United States, and because a wealth of general information has been synopsized in the earlier chapters. Insect structure and development, and methods of control—natural, mechanical, physical, biological and legal—are shortly but adequately dealt with, while chemical treatment, which, after all, is of greatest importance, is referred to in much more detail. The first 66 pages are devoted to these preliminary considerations—a fair distribution in a book which is described as “an introductory textbook of insects in relation to man”. The bulk of the book is divided into chapters dealing with insects according to their orders, of which, following more or less present-day views, 25 are recognized. It is something to find in a book of this kind that each order, whether of economic importance or not, is mentioned, however briefly, for it must certainly give the student who uses it as a working basis a much better idea of insects as a whole. To put a book which deals only with the important orders in the hands of a student tends to develop a one-sided view; no student is, or should be, interested in “economic insects” alone. He may, by force of circumstances, have to confine most of his energies later to a number, a few, or even one, but he is always interested in insects and their relationships, and, besides, who are we to say what is, or is likely to be, “economic”? Under the main orders each important insect is referred to under its family, its life-cycle and control being given, the latter, though leading to slight repetition, being very handy for ready reference. The space devoted to each of these main orders is fairly evenly distributed, Lepidoptera, curiously enough, occupying most—70 pages, Coleoptera and Hemiptera-Homoptera 49, Hymenoptera 37, and Diptera 32. The descriptions are, perhaps, rather inadequate, but they are assisted by the illustrations. We do not care very much for some of the half-tones, which lack clarity, and think that they might be replaced with advantage by well-executed drawings. A little more space might have been devoted to the principles of classification, but we recognize that this is difficult to do concisely. The whole book has been very carefully corrected; the hind wing in Fig. 20 has the inner margin wrongly lettered, and the gender of the genus *Eriosoma* has evidently been confused, but these are of small importance in such a scholarly work as this. L.

Mosquitoes of the Ethiopian Region. I. Larval Bionomics of Mosquitoes and Taxonomy of Culicine Larvae. By G. H. E. HOPKINS. 250 pp. 158 figs. London, British Museum (N.H.), April, 1936.

The larvae of mosquitoes are perhaps better known than those of any other group of insects, partly because of the importance of mosquitoes as transmitters of the organisms which cause malaria, yellow fever and other diseases, partly also because medical entomologists find it convenient to identify their larvae rather than trouble to breed out adults. Specialized knowledge of mosquito larvae has also been relatively easy to acquire because the total number of

species in the world is not very great; Edwards' monograph of the Culicidae recognizes 1400 species, the larvae of about 700 of which have been to some extent described. All workers in Africa south of the Sahara now have the assistance of a fine complete monograph. The first volume by Hopkins on the larvae of Culicine mosquitoes has just appeared. Two others will follow next year, one by Miss Evans on the adults and early stages of Anophelines, the other by Dr. F. W. Edwards on the taxonomy of the adult Culicines and on such general topics as zoogeography. The present volume, apart from its importance to the specialist and the sanitarian, contains much matter of general interest. Special knowledge of the species and ability to identify many of the larvae in the field have led, as they should, to detailed studies of the relation of species to breeding-place. Hopkins has collected a considerable body of information about the chemical and physical qualities of waters and the species found associated with waters of particular types. It is also interesting to notice that the classification, which was based to a considerable extent on the characters of adults, is not found to be faulty now that so many of the larvae are known. The book is fully illustrated with line-drawings, and it appears that the author has summarized existing knowledge very thoroughly. The work is one of which the author and the Museum may well be proud.

P. A. BUXTON.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

—April 9th, 1936.—Mr. F. J. Coulson, Vice-President, in the Chair.—Mr. Royffe exhibited several species of the larger Coleoptera of India; Capt. W. Crocker, a *Maniola jurtina* with absence of the usual apical spot on the fore wing; Mr. Eagles, larvae of *Triphaena fimbria*; Mr. A. W. Dennis, lantern-slides of the ova of several species of *Syrphus* (Dipt.) and egg-shells of *Thecla w-album*. A further series of the slides bequeathed to the Society by the late Mr. R. Adkin was shown.

April 23rd, 1936.—Mr. M. NIBLETT, President, in the Chair.—Dr. Bull exhibited the Noctuid *Cosmophila sabulifera*, form *bipuncta*, a native of N. Africa, Japan, Malay, etc., taken at sugar at Goudhurst in Kent in September, 1935; Mr. Coote, aberrations of *Triphaena fimbria*, *Maniola jurtina*, and a dwarf *Lycæna arion*; Mr. Goodliffe, a series of the grasshopper *Stenobothrus parallelus* illustrating their colour variation; Mr. Stevens Coleoptera from Chatham, *Sphodrus leucophthalmus*, *Helops cocculeus* and *Cissopterus hederæ*; Mr. Tompkins, hibernated larvae of *Callimorpha quadripunctata* (hera) from Dawlish; Mr. Hawkins, hibernated larvae of *Ptychopoda aversata*, from Wimbledon; Dr. Cockayne, extreme variations of the Noctuids, *Agrotis cursoria*, *A. exclamatoris*, *A. nigricans*, *A. cinerea* and *T. stabilis*. Two short papers were read:

Dr. Cockayne, "A Contribution to the Genetics of *Monima incerta*," Mr. Hawkins, "Breeding Experiments with *Erannis defoliaria*"; these were followed by a discussion. Seasonal reports and observations followed from Messrs. Pinniger, Grant, Stevens, Hawkins and Downes.

May 14th, 1936.—The President in the Chair.—The President exhibited six species of S. African Trypetid galls and a Gelechiid gall from the same area; Dr. Bull showed galls on aspen, and read a note on the parasites of the pupa of *Pieris rapae*. He reported a list of species observed in W. Kent during the week-end May 8th–12th; Dr. Blair exhibited a large number of notable Coleoptera, Diptera, Hemiptera, etc., and made remarks on them; Mr. Andrews, a set of typical examples of Diptera (*Tachinidae* and Acalypterates), which he was placing in the Society's cabinet for reference; Mr. Ashby, a small collection of British Hemiptera taken by Dr. Joy and sent by him to be placed in the Society's reference collection; Mr. Priske read a note on the food of *Blaps* (Col.). Mr. Coulson showed a long series of aberrations of *Coccinella 10-punctata* and of *C. bipunctata* and illustrated his remarks by a series of diagrams; Mr. Crawford and Mr. Turner also exhibited.

May 28th, 1936.—The President in the Chair.—Miss Stigant, 175, Gloucester Place, N.W. 1, was elected a member.—Mr. O. Farrell exhibited a mixed gynandromorph of *Saturnia pavonia*; Mr. Ashby, the local Coleopteron, *Rhizophagus parallellocollis* from Chorley Wood, Herts, May 11th, 1936; Dr. Cockayne, preserved larvae of *Xanthia* species; Dr. G. V. Bull exhibited aberrations of *Lasiocampa quercus*, *Brenthis euphrosyme*, *Dianthoecia lepida* (carpophaga), *Boarmia punctinalis* (consortaria), etc., and reported numerous dates of first appearance this season. A short discussion on the genus *Xanthia* took place.—HY. J. TURNER (*Hon. Editor of Proceedings*).

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club was held on Wednesday, May 20th, 1936, Mr. R. W. Lloyd in the Chair. The meeting was called for 7.30 p.m. at 1, 5 and 6 Albany, Piccadilly. Members present (in addition to the Chairman): Mr. H. Donisthorpe, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin, Dr. Harry Eltringham, Mr. W. J. Kaye. Visitors present: Dr. K. G. Blair, Dr. Karl Jordan, Sir Guy A. K. Marshall, Dr. S. A. Neave, Mr. N. D. Riley, Dr. Hugh Scott. Dinner was served at 8 o'clock, and afterwards the Chairman showed and explained his collection of Alpine Lepidoptera. The apartments are rich in articles of vertu and works of art. Only a comparatively small portion could be seen during the evening, but the fine collection of prints and old water-colour drawings presented an opportunity of seeing what is probably a unique collection brought together in private hands. The party remained till the later hours of the evening, and many hopes were expressed that a further opportunity may occur to enjoy even more fully the rare and beautiful things which this first Meeting under the chairmanship of Mr. Lloyd had revealed.—H. WILLOUGHBY-ELLIS.

THE ENTOMOLOGIST.

VOL. LXIX.]

AUGUST, 1936.

[No. 879

A LIST OF BRITISH GYNANDROMORPHOUS SPECIMENS OF *ARGYNNIS PAPHIA* LINN. (1758).

BY S. G. CASTLE RUSSELL.

I GIVE below a list of all the gynandrous *Argynnis paphia* known to me or recorded as having been taken in the British Isles, grouped according to the distribution of the sexual characters of the wings.

I. *Examples in which one side is male and the other female :*

(1) Right wings male, left wings female. Taken by P. M. Bright, New Forest, 1889.

(2) Right wings male, left wings female. Taken by C. H. Williams, New Forest, 1891 ; P. M. Bright Coll.

(3) Right wings male, left wings female. Taken by Dr. H. Charles, New Forest, 1902 ; S. G. Castle Russell Coll.

(4) Right wings male, left wings female (pale coloration). Taken in New Forest 1918 ; exhibited at South London Society Meeting, November 28th, 1918.

(5) Right wings female, left wings male. Taken in New Forest, July, 1893—Sir V. Harpur Crewe.

(6) Right wings female, left wings male. Taken by W. S. Brocklehurst, New Forest, July 18th, 1922.

(7) Right wings female, left wings male. Taken in New Forest ; Clark Coll.

(8) Right wings female, left wings male. Taken in New Forest by F. Nicholls, July, 1916 ; E. A. Cockayne Coll.

II. *Examples in which the male and female parts are nearly equal in extent, but irregularly arranged :*

(1) Right wings and two-thirds of left hind wing female ; remainder of left wings male. The line of demarcation between the sexes lies in the space between the nervures. Taken in New Forest by Capt. Carden, July, 1893.

(2) Left wings male, right wings female, but fore wing has several androconial stripes as in male. Taken in New Forest by S. G. Castle Russell, July, 1921.

(3) Left wings mainly female, right wings mainly male. Bred by L. W. Newman from New Forest larva, 1918 ; P. M. Bright Coll.

(4) Left wings male, right wings partly male and partly female. Bred by L. W. Newman from New Forest larva, 1918 ; P. M. Bright Coll.

III. Examples showing both gynandromorphous and dimorphic characters :

A. One side male *paphia* and the other side var. *valezina* :

(1) Left side male, right side *valezina*. Taken by B. Cooper, New Forest, 1880 ; Fig. in *Entomologist*, 1882.

(2) Left side male, right side *valezina*. Taken by Dr. Gifford Nash, New Forest, July, 1922.

(3) Left side male, right side *valezina*. Taken by J. H. M. Darling and R. C. M. Darling, New Forest, 1918 ; in the British Museum Coll.

IV. Examples in which the division is not perfect, there being streaks or patches of male coloration on the female side or vice versa :

(1) Left side normal male, right side *valezina* except upper edge of fore wing and one-third of hind wing, which are male. Bred by Gulliver, New Forest, July, 1880.

(2) Right wings *valezina*, left wings male except for a splash of *valezina* on top of fore wing. W. F. Urwick, New Forest, July, 1900 ; P. M. Bright Coll.

(3) Left side *valezina* ; on the right side the upper portion of the fore wing is male, and the remaining two-thirds *valezina*. The hind wings male, with a small area *valezina*. Bred by G. Gulliver, New Forest, July, 1916 ; S. G. Castle Russell Coll.

(4) Left side *valezina* ; right side fore wing has a mixture of male and *valezina*, the male colour running the whole length of the costa. Taken by P. Richards, New Forest, July, 1918 ; P. M. Bright Coll.

In preparing this list I have adopted the classification used by Dr. E. A. Cockayne in his paper on "The Origin of Gynandromorphism in the Lepidoptera from Binucleate Ova", published in the *Trans. Royal Ent. Soc.*, London, December 30th, 1935. This very interesting paper goes into the question of gynandromorphism very exhaustively, and includes a large number of continental examples of gynandromorphism in *Argynnis paphia*.

Other articles on gynandromorphism by Dr. Cockayne include the following : "Gynandromorphism and Kindred Problems", *Journal of Genetics*, 5, December, 1915 ; "Gynandromorphous *Agriades coridon*, Poda", *Trans. Ent. Soc.*, London, December 29th, 1916 ; "Intersexual Forms of *Plebeius argus* L.", *ibid.*, July 31st, 1922.

APATURA IRIS IN SURREY.—In the *Times* of July 15th, 1936, Mr. H. Godwin Baynes reports the appearance of a perfect male in a greenhouse in his garden at Byfleet, Surrey.—ED.

OBSERVATIONS ON THE BIOLOGY OF CERTAIN BRITISH PSYLLIDAE.

BY GEORGE HESLOP HARRISON, B.Sc., PH.D.

DURING collecting and breeding experiments in this group of the Homoptera, I have been able to make certain observations of facts which appear to be hitherto unknown or unrecorded, and are set forth in the present paper. Although only six of our British genera are involved, nevertheless, it is felt that many of the results presented are equally applicable to other species, both British and foreign.

VOLTINISM AND PIGMENTATION EFFECTS.

In spite of contrary opinions, often expressed in the past, the British Psyllidae as a general rule are univoltine or single-brooded. Misapprehensions appear to be due to the long life of the individuals and the progressive colour changes these individuals undergo as the season advances—that is to say, seasonal colour changes have been mistaken for seasonal dimorphism such as is exhibited by the Green Veined White Butterfly (*Pieris napi*). For instance, Scott (1880), in discussing the pigmentation of *Psylla peregrina*, talks about the “autumn brood” being red and black; Harrison (1915) states that the “autumn brood” is reddish, and so on; clearly these workers regarded the species indicated as at least bivoltine.

Only a close study of these species and their allies will betray the remarkable seasonal changes they exhibit. The making of collections of insects at regular intervals from the same trees, and breeding experiments in the greenhouse, have revealed the essentially single-brooded nature of the species. Throughout the period of these collections, the complete absence of larvae (except parasitized individuals) and the coloration changes in my cages showed that the light-coloured early summer insects formed the dark populations of the autumn.

Excluding one or two forms, this holds good for the bulk of the species of the genera *Psylla* and *Aphalara*. On the other hand, these experiments clearly demonstrated that many of the Triozinae are polyvoltine. In the genus *Psylla* only *P. pyricola*, *P. nigrita* and possibly *P. subferruginea* produce more than one brood annually. In fact, the great economic danger of *P. pyricola* lies in its trivoltine nature, and its hibernation as an adult. Clearly, it cannot be destroyed like *P. mali* by winter spraying, for the majority of the hibernating adults escape such sprays. When spring returns it commences to breed, so that enormous numbers may result in the third brood of the season. Fortunately, natural parasites, attacking

it at all stages, reduce its numbers in most areas, so that the damage it produces is not beyond bounds.

In the case of the polyvoltine Triozinae, after the first generation, the subsequent generations so overlap that it is difficult to determine the precise number of broods. In the cool greenhouse I found that *Trioza chenopodii* kept breeding from April until November; then it was checked only by the death of the specialized food-plant. Similarly, I found that *T. urticae* might have five generations annually, although it usually gives four. Gall-forming species, no matter what the genus, when their galls are complex structures, are found to have one generation; examples of these are *Trichopsylla walkeri*, *Psyllopsis fraxini*, *P. discrepans* and *Livia juncorum*.

Turning now to pigmentation effects, as has been emphasized previously, there is considerable danger in some species of confusing the curious specialized colour changes, in which the individuals emerging in early summer pass through various shades of colour leading from green to red, with seasonal dimorphism. The principal species showing this peculiar phenomenon are *Psylla mali*, *P. peregrina*, *P. sorbi*, *P. alni*, *P. försteri* and *P. burxi*. Of its existence there is but little indication in the literature. Scott (1880), it is true, draws attention to colour varieties in *Psylla peregrina* and its allies, but so little understands their significance that he was misled into describing the green summer phase of *Psylla mali* Schm. as a new species, *P. viridissima*. Löw (1876) remarks on the great variety of colours which the changing seasons produce, and proceeds therefore to discredit a large number of so-called species erected by Förster. Froggatt (1900) shows an understanding of the phenomenon, for he urges that Australian species when they have attained the adult state show no colour varieties. This he links with the conditions of the Australian flora. He urges that, in that favoured area, the trees show no marked break in their metabolism, leafing, flowering and fruiting continuing without interruption; this is reflected in the Psyllids, so that they too show a steady uninterrupted cycle, and hence no colour changes. In spite of these remarks, it must be made clear that seasonal dimorphism does exist within the group. Of this *Aphalaroida ericae* and *Trioza chenopodii* afford excellent illustrations. Indeed, so marked is it in *T. chenopodii* that one of its generations was described by Lichtenstein as a distinct species under the name of *Trioza atriplicis*.

In addition to the two sources of misconception in respect to specific limits in the Psyllidae already considered, a third exists; this is the use of wing colour in classification. It is a well-known fact that many groups of insects, e.g. the Odonata, exhibit a teneral condition in which the coloration is not mature. My observations

demonstrate that this holds true of the Psyllidae. Unlike the venation, which is fixed from the moment at which the wings reach their maximum extension, the general wing colour and that of the individual cells take quite a considerable time to mature. Any specific diagnosis based on young adult specimens is bound to be of little value, and to lead to errors of some magnitude. Thus Edwards (1896) in his Monograph, in formulating his key to the genus *Psylla*, uses the brown streak in the clavus as diagnostic of *P. salicicola* and *P. rhamnicola*. This character was similarly used for *P. salicicola* by Förster (1848). Löw, however, points out that he possesses many specimens without the streak; almost certainly he is dealing with teneral examples. Unfortunately, too, Löw was concerned with a mixture of two species since separated as *P. klapaleki* and *P. dudai*, respectively, by Sulc. I can, however, state with certainty that *P. dudai* has this character when matured; on the other hand, teneral adults do not display it. Similarly, the green costal vein characteristic of *P. alni* only appears prominently three or more weeks after the emergence of the insects. Further, the brownish fuscous coloration in the wings of *P. brunneipennis* is not discernible in young adults; it develops later, and then becomes very conspicuous. From these facts it seems clear that in the Psyllidae colouring alone cannot be employed as a safe guide in fixing specific limits; it must be used to supply corroborative evidence.

LITERATURE CITED.

- EDWARDS, J.—(1896) *Hemiptera Homoptera of the British Isles*.
 FÖRSTER, A.—(1848) *Verh. d. Nat. Vereins. d. Preuss. Rheinlande*, 67-98.
 FROGGATT, W. W.—(1900) *Proc. Linn. Soc. N.S. Wales*.
 HARRISON, J. W. HESLOP.—(1915) *Naturalist*, 400-1.
 LÖW, F.—(1876) *Verh. Zool. Bot. Ges. Wien*, 26 : 187-286.
 SCOTT, J.—(1876) *Trans. Ent. Soc. Lond.*, 525-569.
 Idem.—(1880) *Ent. Mo. Mag.*, 17 : 65-66.

HYLOICUS PINASTRI IN THE NEW FOREST.—On June 23rd this year, when collecting at Brockenhurst, New Forest, with Mr. and Mrs. Butler, of Burley-in-Wharfedale, I captured a male *H. pinastri* which came to light. I have not heard of a previous capture of *H. pinastri* in the New Forest, but it would seem that this species may be spreading from Dorset.—MERVYN J. L. DAVIS; 8, Osborne Road, Clifton, Bristol, 8.

A CURIOUS FOOD-PLANT FOR PYRRHIA UMBRA.—While collecting near Goodwood with Mr. Riley in August, 1935, we found a larva feeding on Spanish chestnut (*Castanea sativa*). I could hardly believe it was *P. umbra*, but the moth has now emerged and proved it. The usual food-plant is *Ononis*, though in confinement it will eat knotgrass and the green pods of runner beans.—H. M. EDELSTEN; Bramble Hill, Balcombe.

NEW AFRICAN LYMANTRIIDAE (LEP.).

By C. L. COLLENETTE, F.R.E.S.

I HAVE received from Mr. T. H. E. Jackson, F.R.E.S., of Kenya Colony, a most interesting collection of LYMANTRIIDAE taken in Uganda and on Mt. Elgon, from which I have selected for description the following three new species.

All specimens, including the types, are in the British Museum (Natural History).

I am indebted to Mr. W. H. T. Tams for the two drawings which accompany the paper.

***Stracena kamengo*, sp. nov.**

♂. Palpus, head, body and legs light buff to pinkish buff; inner side of tibia of foreleg hair brown; in some specimens a collar of grenadine between head and thorax. Antennal shaft pale pinkish buff, pectinations tawny olive. Fore wing pale pinkish buff; traces of darker antemedial and post-medial fasciae, visible only near the inner margin; a stripe of cinnamon buff along the costa near the apex, and some faint interneural terminal spots of the same colour, extending to the fringe, which is otherwise pale pinkish buff. Hind wing, underside of both wings, and fringes, pale pinkish buff.

Expanse: ♂ 24 mm.

1 ♂ (holotype) August, 1935, Kamengo, S.W. of Kampala, Uganda. Also 1 ♂, January 12th, 1931, Kampala, Uganda, G. H. E. Hopkins; 1 ♂, June 14th, 1933, Bugoma Forest, Uganda, H. B. Johnston.

This species runs down to *Stracena*, and in the absence of a female I have decided to include it somewhat doubtfully under that genus. Vein M^1 in the hind wing rises from well below the upper angle of the cell. May be placed near to *Stracena flavescens* Aurivillius.

***Paraproctis calamolopha*, sp. nov.**

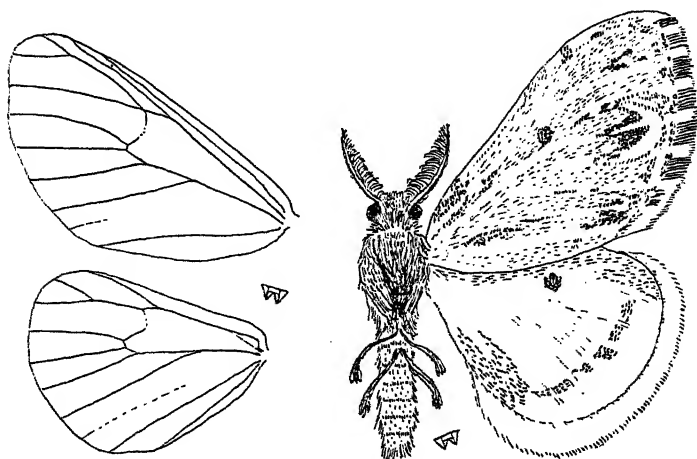
♂. Palpus fuscous. Antennal shaft whitish, pectinations russet. Head, thorax and abdomen light buff; from the basal segments of the abdomen, two pairs of thin dorsal tufts, curved slightly backwards, about 2 mm. in length. Pectus, venter and legs light buff to whitish, mixed sparsely on the legs with cinnamon brown, the tarsi fringed with long hair-scales. Fore wing at the base whitish irrorated with cinnamon brown, shading gradually to cinnamon brown distally; a spot of mummy brown on the discocellulars; the veins in the distal third of the wing lightly marked with whitish and mummy brown; a conspicuous whitish mark subterminally, resembling a 3-pronged fork with points directed basad, the central prong along vein M^3 , the outer prongs curved and reaching veins M^2 and Cu^1 , the angles between the prongs filled in with mummy brown; a pre-terminal fascia, broken at the veins, slightly darker than the ground-colour; fringe cinnamon brown, whitish at the vein-ends. Hind

wing and fringe whitish, lightly irrorated with cinnamon brown in the costal and terminal areas, and with a dark spot on the discocellulars. Underside of fore wing cinnamon brown, mixed on the whole of the lower half of the wing with whitish; a dark spot on the discocellulars and a light streak along the costa near the apex; fringe cinnamon brown, whitish at the vein-ends. Hind wing and fringe whitish; a dark spot on the discocellulars, and a narrow terminal fascia of cinnamon brown.

♀ resembles the ♂.

Expanse: ♂♂ 24–25 mm., ♀ 26 mm.

1 ♂ (holotype) and 2 ♂♂ (paratypes), August, 1935; 1 ♀ (allotype), October, 1935; all taken at Kamengo, S.W. of Kampala, Uganda.



Paraproctis calamolopha Collenette sp. nov. ♂, showing dorsal tufts and venation.

This very interesting insect is characterized by the two pairs of thin curved dorsal tufts on the basal segments of the abdomen. The type of *Paraproctis osiris* Bethune-Baker, is a female in the British Museum Collection, and is the only specimen I have seen; in this specimen there are traces of the dorsal tufts, which appear to have been worn away. In the present species two veins are missing in the fore wing, as in the genotype—apparently veins R^2 and R^5 . Vein M^1 in the present species rises from the upper angle of the cell, while in *P. osiris* it originates from nearly 1 mm. along the stalk which rises from the angle.

Larva.—Two skins, too shrunken for full description. Light buff; a fringe of long spreading hairs laterally, with four tufts of fuscous hairs directed forwards near the head. Some fuscous markings dorsally, with indications of short hair-tufts. Feeds on

lichen on the bark of trees. When crawling, the head and legs are hidden from view by the flat, projecting fringe of hair.

Pupa.—A single pupal skin. Amber brown, shining and apparently hairless. The larva spins a flattened filmy silken puparium, mixed with larval hair, in a hollow of the bark.

Dasychira jacksoni, sp. nov.

♂. Palpus buckthorn brown, on the outer side and at the tip sepia. Antennal shaft bistre, pectinations sepia, the pectinations of the inner row each having one or two conspicuous white scales attached to the shaft. Head, thorax and abdomen sepia mixed with tawny olive, with rounded bistre dorsal tufts on the basal segments of the abdomen. Pectus, venter and legs pinkish buff to pale pinkish buff, the foreleg heavily, the other legs less heavily, banded and marked with sepia. Fore wing snuff brown; an indistinct fuscous sub-basal fascia; a fuscous antemedial fascia, angled outwardly below the origin of vein Cu^2 and inwardly below the 2nd anal vein; discocellulars edged narrowly with fuscous; a crenate post-medial fascia, points on the veins, bowed (convexity terminad) from costa to vein Cu^2 , thence slightly oblique outwardly to the inner margin; the area between antemedial and post-medial fasciae tinged with greyish olive; a conspicuous fuscous subterminal fascia, outwardly oblique from costa to below vein R^5 , inwardly to below vein M^1 , again outwardly to below vein M^3 , again inwardly to below vein Cu^1 , thence direct to the inner margin; a fuscous streak running from the post-medial fascia to the termen below vein R^5 and a second below vein M^3 , a fuscous streak on the proximal side of the fascia below vein Cu^2 , and a small whitish patch on the distal side of the fascia below vein Cu^2 ; a narrow fuscous preterminal fascia, broken at the veins; fringe Saccardo's umber, tawny olive at the vein-ends. Hind wing and fringe pale pinkish buff; a faint fuscous mark on the discocellulars; a faint fuscous subterminal streak near the anal angle; the fringe marked with fuscous between the subcostal vein and vein M^1 . Underside of both wings pale pinkish buff; costal area of both wings irrorated with fuscous; discocellulars of fore wing heavily, and of hind wing lightly, marked with fuscous; traces of a fuscous post-medial fascia on each wing, strongest near the costa; fringes pale pinkish buff, marked interneurally in the fore wing with fuscous.

♀ resembles the ♂, but with the hind wing and underside of both wings darker.

Expanse: ♂♂ 40–42 mm., ♀♀ 44–47 mm.

1 ♂ (holotype), 1 ♂ (paratype) and 1 ♀ (allotype), October, 1934; 1 ♀ (paratype), November, 1934; 1 ♂ (paratype), 1935; all from Mt. Elgon, Kenya Colony. 1 ♀, Lake Nabugabo, S. of Masaka, Uganda.

May be placed near to *Dasychira elaeochroa* Collenette. I am indebted to Mr. W. H. T. Tams for pointing out the interesting

scales on the pectinations of the antennae. These are present also in *D. elaeochroa* and, among others, in *D. ruptilinea* Holland, *D. hypocrita* Hering, *D. umbricolora* Hampson and *D. muscosa* Holland.

Pupa.—A single pupal skin. Cinnamon brown, shining, with sparse, rather long, pale hairs; in a thin cocoon apparently largely composed of larval hair.

NYMPHALIS ANTIOPA L. IN WILTS.—While waiting for a train at Westbury station at 5.30 p.m. on June 27th, I saw a specimen of *N. antiopa* flying about under the glass roof of the station. The margins of the wings seemed rather more yellow than is usual in hibernated specimens.—F. A. LABOUCHERE (Col.); 15, Draycott Avenue, S.W. 3.

NYMPHALIS POLYCHLOROS IN CORNWALL AND HANTS.—In view of the general scarcity of this species nowadays, it may be of interest to point out that in the *Western Morning News* (September 24th, 1935), one was reported at Falmouth, and in the *Field* (September 21st, 1935), another at Compton, near Winchester.—C. NICHOLSON; Tresillian, Cornwall, September 28th, 1935.

VANESSA ATALANTA AB. *FRACTA* TUTT. IN THE SOUTH OF FRANCE.—Noticing the black bar interrupting the red band at the median vein on the fore wing—ab. *fracta* Tutt.—in most of the *atalanta* that I had taken at Menton, and Mr. Riley having kindly ascertained the proportion of this aberration among the *atalanta* in the British Museum collection to be only about 5%, I examined 36 consecutive captures at Menton (10 on October 24th, 10 on October 27th, and 16 on November 14th, 1929) and found it present in 29, or just over 80%. This shows clearly that Dr. Seitz was right in saying that this aberration occurs especially in Southern districts (Italy), although, as he says (vol. i, p. 198), it occurs here and there among the main forms; indeed some specimens taken by me at Aix-les-Bains show it, and also one I took at Dinard shows it slightly on the underside only.

This black bar across the red band is, when present, always more marked on the underside; it may even be quite distinct there when not noticeable above, and it is usually accompanied by a zigzag sinuosity of the red band of the fore wing. Examples showing the red band completely interrupted are only about 8% or less; and those with continuous uninterrupted red band seem in about the same proportion. This sinuosity and the yellowish vermilion tint of the band, as compared with the straighter, scarlet band in northern examples (*e.g.* from Dinard, Brittany), the encircling posteriorly with red of the black spot in the cell of fore wing beneath, and the large black spots on the red band of the hind wing above in some Menton specimens, are characters in these southern examples of *atalanta* like some in *Vanessa indica*.—(Lt.-Col.) H. D. PELLE; 1, Sackville House, St. Leonard's Road, Bexhill.

MIGRATION RECORDS, 1936.

By CAPT. T. DANNREUTHER, R.N.

DURING the latter half of June, 1936, there was a considerable immigration into the south of England mainly of *Plusia gamma* associated with *Nomophila noctuella* and *Vanessa cardui*. Records in hand excluding those of single individuals going north or N. are as follows :

(1) *Records of Insect Movement.*

(6) April 24th to May 3rd. *Pieris napi* : At Exmouth with westerly winds ; 3 on 24th, 3 on 26th and 2 on 29th were reported flying N.E. ; but on May 3rd 6 males flew S.W. (I Henstock).

(7) May 9th. *Pieris rapae* : At Start Lighthouse, Devon. 3 came in from sea, going north at 3 p.m. No other immigrants seen until June 19th here (A. W. Godfrey).

(8) June 17th. *Pieris rapae* : At Salthouse, N. Norfolk, 1 seen flying west at noon in a fresh S.S.E. wind following the coastline below a shingle bank, getting some shelter. Warm sun (R. M. Garnett).

(9) June 18th to 20th. *Plusia gamma* : Jersey, Channel Islands, in thundery weather with a moderate S.W. breeze a few appeared of both sexes. Next day they were present in moderate numbers. On the 20th hundreds were seen (Dr. A. C. Halliwell).

(10) June 18th. *Plusia gamma* : At Rodborough Fort near Stroud, Glos, in calm weather at 10 p.m. at least a hundred appeared at valerian flowers, which were noted as "not fresh". A very pronounced wave of immigration heralded by a few the previous day. It passed through leaving about 25% behind, possibly augmented by stragglers. Others seen four miles away next day (T. B. Fletcher).

(11) June 19th to 28th. *Plusia gamma* and *Nomophila noctuella* : At Hastings, from the half mile of covered parade lights facing the beach, watched nightly from 11.30 p.m. to 1.30 a.m., the species was absent on the night of the 18th. On the 19th hundreds turned up. On the 20th and each night to the 24th hundreds were seen, reaching a maximum on the 23rd of perhaps a thousand or more, after which numbers decreased until, on the 28th, only 27 could be counted. Each night *Nomophila noctuella* was also present—in many dozens on the 23rd. Same observer also reported many dozen *P. gamma* flying in sunshine in Wilmington Wood on the 20th (H. G. Macleod).

(12) June 19th to 24th. At the Start Lighthouse several species in small numbers seen coming in from sea and going north in light

winds; 19th, 2 a.m., 4 rather worn *P. gamma* alighted on lantern; 20th, p.m., 5 worn *Vanessa atalanta* arrived as fog cleared; on 24th 3 others; 20th and 22nd, a male and female *Colias croceus* arrived from S.W. and flew N.N.W.; 22nd and 24th, 4 *Vanessa cardui* in fair condition arrived each day flying rapidly inland, preceded by one on 21st at 4 p.m. (A. W. Godfrey).

(13) June 19th to 26th. At Newton Abbot "there arrived great numbers of the usual immigrants—*P. gamma*, *V. cardui*, *V. atalanta*, *C. croceus* and probably others—many of these being seen on various parts of the moorland frequenting flowers" (R. C. L. Perkins).

(14) June 19th to 23rd. *Vanessa cardui*: At St. Columb and Penryn Reservoir, Cornwall. About a dozen 19th–20th, 8 on 22nd and 16 on 23rd were all seen flying north. Wild S.W. weather on 22nd–23rd (C. M. Rogers).

(15) June 21st to July 5th. *Plusia gamma*: Isle of Wight. On a visit to the east and S.E. of the island from June 20th to July 5th, the first day none were seen, but at 12.30 p.m. on 21st about a dozen arrived from sea, half of which flew N.W. and the others stayed to feed at flowers on the cliff. After this numbers increased until the 30th, when it was present in great abundance—one or more flew up at almost every step walking through the herbage, many in very poor condition. From July 1st numbers decreased rapidly, and when leaving the locality on July 5th they were comparatively scarce. "Had I been able to remain by the sea each day I doubtless would have seen thousands arrive." Of 12 captures, 5 were males and 7 females, all in poor condition. It was a hot spell with variable wind. Amongst a hundred noted no egg-laying was observed and the general direction of flight was to the N.W. or west (A. A. W. Buckstone) (the *Times*, July 21st).

(16) June 21st to July 3rd. *Vanessa cardui*: E. and S.E. Isle of Wight. About 200 were seen in all. Sixteen captured were all females in poor condition. On arrival from sea many were observed to lay a dozen or more eggs at once on thistle, or even nettle, together on single plants. During the hot spell on 21st and 24th the speed was rapid to the N.W. and west, but otherwise slow. After the 26th only 2 or 3 stragglers in poor condition were seen daily, not migrating (A. A. W. Buckstone).

(17) June 22nd to 27th. *Colias croceus*: At Sandown, Isle of Wight, a male was seen coming in from sea flying west, and during the next four days 20 were noted looking fresh and larger and paler than typical specimens. All were males and 5 were captured. None seen after 27th (A. A. W. Buckstone).

(18) June 22nd. *Vanessa cardui*: At Reading, Berks, 3 seen flying fast to the north (*per* W. L. Rudland).

(19) June 22nd to 26th. *Colias croceus*: At Penryn Reservoir and Belowda Beacon, Cornwall, 4 to 6 seen flying north daily (C. M. Rogers). On 23rd, three at Stover, Newton Abbot, and one at Ashburton seen flying north or N.E. All males (S. T. Stidston).

(20) June 23rd. *Plusia gamma*: At Kingston Deverill, Wilts. 7 seen flying north and 20 others captured on 24th in long grass in sunlight in good condition (Mrs. I. Gibson).

(21) June 24th. *Macroglossum stellatarum*: Only 1 recorded at Helston, Cornwall, on that date (C. H. Langham).

(22) June 23rd. At the North Foreland Lighthouse between 1.30 and 2.45 a.m. several large moths passed the light coming in from sea. At 8 a.m. a specimen was taken on the flagstaff halliards which proved to be a worn *Dicramura vinula* (resident species) (H. W. Bowling).

(2) *Other Migrant Insects Present, June, 1936.*

Vanessa cardui: A specimen, with *V. atalanta*, was seen on the 4000-ft. summit of Storlog, Norway, in lat. 61° 20' N., long. 7° 5' E., in hot sun, June 24th (C. F. Tebbutt). In England mostly reported in S.E. and S.W. counties on 53 cards for June, of which 37 relate to single specimens, the first appearing at Polegate on June 1st at 2 p.m. (C. H. H.). Over 350 after June 18th, reaching Northumberland on 20th.

Vanessa atalanta: In British Isles 53 record cards received for June, including 29 of single specimens. Less than 200 estimated, but "quite a lot" at Eastbourne on 22nd (C. H. H.).

Control insects: Both *Aglais urticae* and *Nymphalis io* appeared rather late and generally below average except in the north. Fresh emergences noted in Kent from June 17th; up to July 9th in Gloucestershire.

Colias croceus: At Bayonne in the S.W. of France, June 17th was the first really fine, warm day and both males and females were present, increasing in numbers daily up to June 27th, when the numbers seemed reduced (G. T. Adkin). Seven solitary scattered specimens arrived going northward from June 20th to 22nd, after which they were fairly common in Isle of Wight and the west country; but only isolated specimens elsewhere and these only spread along the south coast. Twenty-eight cards in hand include 20 for single specimens (8 female), and account for about 80 in all present in June, of which one was *v. helice*, and one, later, seen ovipositing on *Trifolium minus* in a corn-field near Truro, July 5th (C. Nicholson).

Herse convolvuli: At Brighton on June 29th a damaged specimen full of ova was brought to Brighton Museum and released (H.S.Toms).

Macroglossum stellatarum: See Section (1) above. At Bayonne,

Basses Pyrénées, the species "is present all the year round and usually abundant, and their absence until June 26th this year has been very noticeable" (G. T. Adkin).

Plusia gamma: 83 cards for the latter half of June alone account for the presence of at least 7000. The districts where swarms of a hundred or more were reported are: Jersey, East and North Kent, East and West Sussex, Isle of Wight, Dartmoor, Stroud (Glos), Wiltshire, Oxford, Surrey, London (ovipositing 19th/20th in N.W. 10), Barrow-on-Soar (Leics), Beccles (one on 6th, "an invasion in strength later"), Gorleston on east coast, and Fishguard on the west. At other places in the north it became common about the 23rd. It appeared, as solitary specimens or in small numbers only at first, at Grange-over-Sands (Lancs) on the night of June 11th; in the Isle of Man on the 19th; in Northumberland on the 20th (in hundreds at Catcleugh on 23rd), and was very common in Mid-Durham by the 24th. In Scotland it was recorded in latitude 57° N., and in the Isle of Barra (Outer Hebrides) on the 23rd. As the maximum density in the Isle of Wight did not occur before June 30th, the immigration appears to have lasted for ten days, and the year 1936 may prove to be a "Silver Y year" (see the *Times*, July 14th and 21st).

Nomophila noctuella Schiff.: At Bayonne it first appeared at light on May 27th, and was swarming in great numbers about June 19th at St. Jean-de-Luz (Mrs. Muspratt), since when dozens occurred at Hastings and single specimens at Braintree (Essex), Felpham and Truro (very worn July 5th).

Plutella maculipennis Curt.: At Grange-over-Sands one taken May 18th and several on June 8th (A. E. Wright). In the Cardigan and North Pembroke districts enormous numbers of both sexes were present from June 23rd to 25th in fresh condition (J. W. R. Jenkins). At Stroud (Glos) the species was reported common, but locally bred without any sign of migration (T. B. Fletcher).

(3) Scarce Vagrant Records.

Celerio euphorbiae L.: Prof. Beckwith Whitehouse reared a perfect female which emerged after forcing on January 1st. The species had been reported common in the Channel Isles in 1935, and this pupa was found at Woollacombe, N. Devon, on September 19th, 1935.

Celerio galii Rott.: At West Hartlepool on the evening of June 24th a fine specimen was caught in a smoke-room and released after identification (J. W. Goldson). Larvae had been found at Birtley in 1935 (Heslop Harrison).

Pyrausta nubilalis (Cloudy China Mark): In East Kent near Deal on June 21st a good female was captured attracted to light

at 11 p.m. (H. C. Gunton); specimen was identified at British Museum (N.H.) as a rare immigrant not listed. A second female was taken the same day on Cliff Down, near Lewes, by C. O. Ridley.

(4) *Records of Insects at Sea*, 1936.

June 14th when 180 miles E.N.E. of Aberdeen bound for Bergen at 20 knots a female *Plusia gamma* fat with ova settled on deck at 9 a.m. and another at 10.30 a.m. There was a slight S.E. wind and fog in patches (C. F. Tebbutt in M.V. "Venus").

June 15th to 23rd. Passengers cruising at 19 knots in the Mediterranean observed butterflies on the boat deck of P. & O. S.S. "Strathaird", to clear which required a rise of 90 ft. above water:

(a) 3 p.m. 15th, 20 miles east of Gibraltar, a brown butterfly going north.

(b) 11.30 a.m. E.T. 16th, a 2-in. mottled yellow-brown butterfly passed to south in lat. 37° N., long. $3^{\circ} 20'$ E.

(c) Noon E.T. 16th, a fresh *Vanessa atalanta* flew on board and off again in lat. $37^{\circ} 9'$ N., long. $3^{\circ} 26'$ E. (400 miles east of Gibraltar).

(d) Mid-day 18th, at anchor off Corfu, of 5 *Pieris brassicae*, 2 *P. napi* and 4 *Gonepteryx cleopatra* and dragonflies passing over ship in two hours, 9 were flying east and 2 west (*P. brassicae*).

(e) Noon 23rd, 100 miles east of Gibraltar a brown butterfly and a 1-in. brown Noctuid flew on board and left.

(f) 5.30 p.m. B.S.T., a *Pieris brassicae* passed going east with a strong west wind when a mile off Europa Point, Gibraltar (J. Evershed and T. D.).

No Lepidoptera were received in June from Light Vessels, but Mr. J. W. R. Reed brought in a large Caddis fly and a gnat for identification, taken in the Outer Dowsing Light Vessel (E. A. Ellis).

ZYGAEANA LONICERAE LARVAE FEEDING ON PENNYWORT.—On May 30th, 1936, I found larvae of this species feeding on this unusual food-plant in a marsh on the Norfolk coast near Horsey. They were quite plentiful, and appeared to be feeding on nothing else.—E. W. CLASSEY; 141, Portnall Road, W. 9.

LIBELLULA DEPRESSA IN YORKSHIRE.—I have just taken an *L. depressa*. I have never seen it in Yorkshire before.—C. W. V. GANE; Marton Hall School, Bridlington.

[Mr. Cowley kindly informs me that it appears to have been first reported from Yorkshire in 1901 by G. T. Porritt (*Naturalist*, 1901, p. 11).—ED.]

NOTES ON BRACONIDAE: XV.—MICROGASTERINAE.

BY CLAUDE MORLEY, F.R.E.S., F.G.S., F.Z.S.

(Continued from p 163.)

Four species have been added in the interim to the dozen known as British in 1885; Mr. Lyle has described *M. ruricola* as new; and *M. alvearia*, Fab., is here restored from *Microgaster*, with which its affinities are remote.

1. *Microplitis spinolae*, Nees.—Apparently rare; I captured a female at Frostenden in Suffolk on September 10th, 1919.

2. *M. xanthopus*, Ruthe.—Apparently rare; I have swept ♀♀ in Southwold salt-marshes, Suffolk, on August 1st, 1904, and in the peat-moor at Shapwick, Somerset, early in July, 1933.

3. *M. fumipennis*, Ratz.—Dantzick; "Hongrie, Szépligeti: Angleterre, élevé par Bignell de *Taeniocampa miniosa*, Fab." (Marshall, 3: 181). Unknown to me.

4. *M. ocellatae*, Bouché.—A ♂ bred from *Hastula hyerana* at Taormina in Sicily during April, 1905, along with numerous *Microgaster suffolciensis*, Morl. (Dr. Chapman); 3 bred from their own cocoons out of *Charaas graminis* in Delamere Forest during 1917 (T. A. Coward); 9 from their own cocoons, whose larvae emerged from a single larva of *Smerinthus ocellatus*, L., at Godalming in Surrey during September, 1928; imagines appeared on June 18th, 1929 (Oswald Latter); "also from *Smerinthus tiliae*, L." (Marshall's MS.). Captured at Louth in Lincs, June, 1912.

5. *M. vidua*, Ruthe.—One ♂ raised from *Eucestia rufata*, Fab., i. e. *Chesias obliquaria*, Bkh., at Market Drayton in Salop on December 7th, 1901: "This is the first year I have observed that moth to be parasitized; this year four or five were so infested; the Braconid larva in each case emerged from the caterpillar's tenth segment; the latter was stunted, reaching only to about three-quarters of its proper size; I presume emergence at this time of year is owing to their box being kept in a warm room" (F. C. Woodforde). Eleven emerged solitarily from larvae of *Fidonia limbaria*, Fab., at Creting in Suffolk during 1900, along with the hyperparasitic ichneumon *Mesochorus pectoralis*, Ratz. (*Trans. Suff. Nat. Soc.*, 1932, p. 10). One ♀, quite typical excepting in its hind tibiae, which are flavidous almost to their apices, was sent me from Bejar in Spain on a cork, with details: centrally is the parasite; on one side is the larval skin of *Orgyia aurolimbata*, Gn.; on the other the perfect apterous ♀ of the moth; below is the latter's cocoon, of which the sinister half contains its own pupa, and the dexter half the cocoon of the *Microplitis*. A curious case of the parent parasite intruding too sparse a number of eggs

to slay the host; so both attained maturity (Chapman at *Entom. Rec.*, 1903, 15: 118. Not *Microplitis hispalensis*, Msh.). Several beaten from trees at Wilverley in New Forest in mid-June, 1907; and several swept on Brandonroad Heath in Suffolk in mid-June, 1914.

6. *M. spectabilis*, Hal.—Many bred from a single larva of *Agrotis ypsilon*, Rott., at Oxford by Mr. Claude Rippon, circa 1920 (Hamm). Commonly captured: Blackheath in Kent during August, 1898 (Alfred Beaumont); Greenings and Reigate in Surrey during July, 1872 (Saunders); and in Suffolk under old matting at Blakenham in June, 1904, by sweeping at Foxhall in May, 1907, in fly-trap during July, and several females on evening of May 7th, 1923, on house windows at Monks Soham.

7. *M. tristis*, Nees.—Thirty-two bred from *Dianthaecia cucubali* in Suffolk during the autumn of 1898 (W. H. Tuck); 40 bred from *Dianthaecia capsicola* larvae at Eastbourne in Sussex on August 8th, 1900 (A. M. Montgomery). I have captured no more than a single ♀, on *Heracleum*-flowers, at Bedingfield Hall in Suffolk on September 9th, 1917.

8. *M. dolens*, Msh.—A ♂ on *Angelica*-flowers by the River Gipping at Blakenham locks on August 12th, 1899.

9. *M. sordipes*, Nees.—One ♀ only bred from its own cocoon in the New Forest on November 28th, 1900 (Miss Chawner); 1 sent me in 1907, bred from a *Lepidopteron* at Hyères (Dr. Chapman). Bred in England from young larvae of *Mania typica* (Marshall, 3: 182).

10. *M. eremita*, Reinh.—The first recognized British example of this species was a ♂, captured, after Marshall's 1885 monograph had been published, at Earlham, near Norwich, on July 28th, 1889, by J. B. Bridgman (*Trans. Norf. Nat. Soc.*, 5: 65). Several other ♂♂ were beaten from birch bushes in Tuddenham Fen in Suffolk on May 6th, 1907, by the late Arthur J. Chitty and me.

11. *M. strenua*, Reinh.—“Angleterre,” simply (Marshall, 3: 182). One only bred from its own cocoon out of a larva of *Acronycta psi*, Linn., sent from Ely in Cambs during mid-September, 1900 (J. W. Cross); swept singly, with the above *M. eremita*, in the conterminous Icklingham marshes on May 5th, 1907.

12. *M. mediator*, Hal.—Twenty-three bred from their own cocoons out of *Leucania straminea*, Tr., in west Somerset during 1908 (Slater); 1 was captured while flying among *Aphis crataegi*, Kalt., in Monks Soham garden on September 7th, 1908.

13. *M. adunca*, Ruthe.—Males, which sex is UNDESCRIBED but differs only sexually from the females, are in my collection from that of Albert Piffard, who took them at Felden in Herts about 1890; Dr. Capron had tentatively termed them “*Microplitis* sp. ?”.

14. *M. borealis*, Msh.—Certainly a good species and not the alternate sex of the last, as at first appeared probable. I have the UNDESCRIBED ♀, which differs merely sexually, in Piffard's collection from Felden in Herts; and myself swept the male at Grovely Wood in Wilts on June 27th, 1911.

15. *M. alvearia*, Fab.—Ninety-five, of which I possess 8, emerged on September 3rd, 1880, from a wall of their cocoons found below a single larva of *Boarmia rhomboidaria* on 19th of the preceding August at Stoke in Devon (*Entom.*, 13 : 245); 81 ♀♀ bred from their similar cocoons found beneath one larva of a Geometer on *Cupressus macrocarpa* in early August, 1906, at Corfe Castle in Dorset (Bankes). Not uncommon at Monks Soham, both on house-windows and in garden, sometimes in spiders' webs, always in September and late August. I found a group of cocoons at Ipswich in February, 1900.

16. *M. mediana*, Ruthe.—Common; I have seen none bred. New Forest (Miss Chawner); Greenings in Surrey (Saunders); Blackheath in Kent, August, 1898 (Beaumont); Felden in Herts (Piffard). Suffolk during May, June, July and September at Claydon, Coddendam on the sand of a chalk-pit with *Halicti*, Southwold, Frostenden, Spexhall, Icklingham and Tuddenham Fen, sometimes on Angelica-flowers.

17. *M. tuberculifera*, Wesm.—Three bred from *Dianthaecia irregularis*, Huf., in Suffolk during September, 1899 (W. H. Tuck). Shere in Surrey (Capron); Louth in Lincs, June, 1912 (Elliott); Cuckney Hay Wood, Langwith in Notts, August, 1914; swept in Ipswich marshes during June, 1896, and in Tuddenham Fen during June, 1915.

MICROGASTER, Latreille.

Hist. Crust. et Ins., 1805, 13 : 189.

Table of Species.

- (18) 1. Basal segment longer than apically broad. Small or normal; abdomen narrower, basally smoothish, terebra short; hind legs slender; wings hyaline, radial cell broad, areolet triangular and often incomplete.
- (15) 2. Second segment as long as third or very nearly so.
- (8) 3. Disc of second segment in no wise sulcate.
- (5) 4. Metanotum rugose; coxae white; terebra sub-elongate 1. *posticus*, Nees.
- (4) 5. Metanotum smooth; coxae not white; terebra subexserted.
- (7) 6. Legs and sides of venter pale; length 2 mm. 2. *flavipes*, Hal.
- (6) 7. Legs partly and whole venter nigrescent; length $1\frac{1}{2}$ mm. 3. *minutus*, Reinh.
- (3) 8. Disc of second segment deeply bisulcate.

backyard in this town. It is unusual for this moth to appear as far north as this, especially in the Black Country, though last year I took a male *Smerinthus ocellatus* here.—I. D. W. KNOWLES ; 21, Somerford, Willenhall, Staffs.

[Tutt gives only two records from Staffordshire, where, undoubtedly, the species is rare.—ED.]

PLUSIA INTERROGATIONIS UNUSUALLY ABUNDANT.—There is an extraordinary increase in this species over the last two seasons. They have always been common in a few very localized patches near Scarborough, but this year I have found larvae all over the moors, as far north as Whitby. Usually half the larvae one finds are “stung”, but this year Dr. Schmidt and I examined many hundreds without finding a single parasitized larva.—C. W. V. GANE ; Marton Hall School, Bridlington.

CERATOPOGONIDS ON WINGS OF DRAGONFLIES.—With reference to my remarks on this subject (*Entom.*, 69 : 150) in last month's issue, I should like to call attention to a further record, namely by Mayer, in *Arb. morph. taxon. Ent.*, 3 : 1-3. In this paper, published this year, there is a photograph showing flies *in situ* on a dragonfly wing.—J. COWLEY ; Norwood Hill House, Horley, Surrey.

MIDGES ATTACKING CATERPILLARS.—A number of instances have been placed on record of Ceratopogonid midges sucking the blood of caterpillars, the victims being generally large smooth larvae such as those of the Sphingidae, and the aggressors members of a particular section of the rather complex genus *Forcipomyia*. Two or three species of this group of midges are known to occur in Britain, but their feeding habits have not hitherto been observed in this country. Early this year, however, Mr. T. Bainbrigge Fletcher submitted to me specimens of one of these species (*F. pallida* Winn., or a closely-related species) which were taken feeding ; his note on the subject is printed below. The fact that these midges were taken at night may be significant ; perhaps lepidopterists who hunt for larvae at night may be able to provide further examples of this form of parasitism.—F. W. EDWARDS.

CERATOPOGONINE FLIES SUCKING GEOMETRID LARVAE.—The note made at the time, under date September 8th, 1934, reads : “After dark, several small green Geometrid larvae hanging on threads from Whitebeam were noticed to be attacked by small Ceratopogonines, which were sucking their blood, two or three flies on each larva.” This was at about 10 p.m. in my garden at Rodborough. At the time I was not certain of the identity of the larva, so took two of them, which were boxed with the flies on them. One larva died a day or two afterwards (? as result of being attacked), the other one fed up on Whitebeam and was identified as *Opisthographis luteolata* Linn. It pupated in due course, but the pupa died before emergence of the moth.—T. BAINBRIGGE FLETCHER ; March 2nd, 1936.

A HANDBOOK ON BRITISH CADDIS FLIES (TRICHOPTERA).—We are informed that a handbook on the British Caddis Flies is in course of preparation. Mr. M. E. Mosely, the author, states that the work is intended for the general collector and, in order that it may be available to the public at a reasonable price, the text will be reduced to the barest minimum. In each species, however, the important structures of the genitalia will be sufficiently figured to enable it to be easily recognized by the careful student. In the few instances where McLachlan's descriptions are not altogether satisfactory, the species in question will be redescribed and refigured. McLachlan's *Revision and Synopsis of the Trichoptera of the European Fauna*, the standard work on the subject, has long been out of print, and it seldom appears in the second-hand lists; there is apparently no other available work on the Order.

This handbook will therefore fill a real need and, it is hoped, will encourage an interest in this rather neglected order. It is expected to be published in 1937 or early 1938 by G. Routledge & Sons.—ED.

RECENT LITERATURE.

The Biology of Mayflies, with a Systematic Account of North-American Species. By JAMES G. NEEDHAM, Ph.D., Sc.D., Litt.D., JAY R. TRAVER, Ph.D., and YIN-CHI HSU, Ph.D. Comstock Publishing Co., Inc., Ithaca, New York, 1936.

Prof. James G. Needham, assisted by two other authors, Dr. J. R. Traver and Dr. Yin-Chi Hsu, has produced a very valuable work indeed in his *Biology of Mayflies*. It is intended, of course, mainly for the American student of the Order, as about 500 pages have been devoted to the systematic description of North American species. Yet the 236 pages devoted to the biology proper have a far wider interest and form perhaps the fullest contribution so far made to the knowledge of the life-history in this interesting and little-known Order. These pages on the biology have naturally an important appeal to the entomologist, but they are also of value to all who are concerned, from the economic aspect, with the food of fishes, more particularly the trout. The book has one outstanding feature: the work is original; a band of workers has been gathered together by Prof. Needham, who give us the results of their researches in their own words and under their own names. This practice should be more generally followed in similar publications. The second author, Dr. J. R. Traver, is responsible for nearly the whole of the systematic descriptions as well as a portion of the earlier part dealing with life-history and collecting. Dr. Yin-Chi Hsu deals with structure and anatomy, while further chapters on this branch of the subject have been contributed by Dr. V. Knox. In Chapter I there is an account of the life and habits of the Ephemeroptera, or, as they are misleadingly called, not only throughout America, but even by some in this country, the Mayflies. This title is misleading, because the species of the Order may be seen on the water during

every month of the year, and the name may be said to be preoccupied in angling literature, in which the term "Mayfly" is restricted to species of the genus *Ephemera*. Prof. Needham gives an account of an American species, *Calibaetis fluctuans*, which endures in the winged stages for only some forty-eight hours, during which it emerges from the water, changes from sub-imago to the imago stage, pairs, lays its eggs and finally dies. This very ephemeral endurance must not, however, be taken as the general rule, since in this country adult males of *Ephemera vulgata* have been observed still on the wing some months after emergence from the water, the colour having darkened to nearly black from prolonged exposure. We are told of species swarming in such numbers that camp fires have been extinguished beneath their shrivelled corpses. Several pages are devoted to the nymphal stages, and Dr. Hsu's chapters on structure then follow. Internal anatomy, as well as external parts are fully explained, and there is an account of the nymphal development moult by moult. Dr. O. R. Smith contributes a most interesting chapter on the eggs and methods of oviposition. Then we find passages on fossils, on the economic value of the flies, and also on methods of rearing them in captivity. Finally we come to the systematic chapters in which Dr. Traver gives useful keys and tables. It suffices to state that this part of the book deals with 507 species grouped in 3 families, 17 subfamilies and 47 genera. A very valuable contribution to entomological literature. MARTIN E. MOSELY.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.—June 11th, 1936.—Mr. M. Niblett, President, in the Chair.—The evening was mainly devoted to an exhibition of living larvae, to which numerous members contributed, including Messrs. Bliss, Hawkins, Tompkins, Eagles, O'Farrell, Howard, Grant and others.—Mr. Coulson showed the Coleoptera which he had taken at the Horsley Field Meeting; Mr. Stephens, the rare *Langelandia anophthalma* from Chatham. Dr. Bull reported on ants found devouring a *Brenthis euphrosyne*. Mr. Hawkins, on behalf of Dr. Cockayne, exhibited and read notes on the larvae of *Aplasta ononaria* from Germany and of *Lithosia lurideola* from Eynsford eggs, and commented on a parasite of *Abraxas grossulariata*. Mr. Turner exhibited the ♂ and ♀ of the strikingly beautiful Theclid, *Thecla coronata*, from Ecuador; he also showed *Colias dimera* from an elevated part of the Baños area, and remarked on the unexpected occurrence of *C. lesbia*, an Argentine species at the same place; also some very dark, almost black larvae of *Boarmia rhomboidaria*, a ♂ of the large Bombycid, *Eocles imperialis*, from Brazil, with a coloured photograph of the same species.—HY. J. TURNER (*Hon. Editor of Proceedings*).

CORRECTIONS.—P. 24, line 10, for *Orellia fulcata* read *Orellia falcata*; line 13, for *paleata* read *falcata*; and for "Isle of Wight" read "Thames Marshes, Abbey Wood".

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club was held at Chantry Lodge, Guildford, on Saturday, May 30th, 1936, Mr. W. J. Kaye in the Chair. Members present (in addition to the Chairman): Mr. H. Donisthorpe, Mr. H. Willoughby-Ellis, Mr. Jas. E. Collin. Visitors present: Mr. H. E. Andrewes, Major E. E. Austen, Dr. K. G. Blair, Mr. Hugh Main, Mr. F. A. Oldaker, Mr. W. H. T. Tams, Mr. C. J. Wainwright, Dr. G. A. Waterhouse, of Australia. At 12.30 the guests were received by Mr. and Mrs. and the Misses Kaye on the terrace of their garden, the beautiful and extensive views over the Surrey hills being much admired. Amongst the interesting collections in the Chairman's Museum the Trinidad collection of *Rhopalocera* created much interest. The butterflies of Trinidad number over 600 species. The Sphingidae and several groups of mimetic species of *Heliconius* were also inspected and discussed. Amongst the latter were *Heliconius charithonia*, from the larger Antilles, and its female *Dismorphia* mimic which differs widely from its males. At 1 o'clock luncheon was served and early in the afternoon most of the members and guests walked, under the guidance of the Chairman, up to St. Martha's Chapel, which stands on a hill 573 ft. high. The views from this point are very fine and can be enjoyed towards every point of the compass. The present little church is barely 100 years old, having been entirely restored from what was nothing but a ruin. The original structure was built about 1190 on a spot once the scene of the execution of some early Christian martyrs (hence the corrupted name of St. Martha's) and was used as a Chantry by pilgrims journeying to Canterbury during the Plantagenet period. On return to Chantry Lodge, tea was served on the terrace in warm and sunny weather, which enabled the view across the hills to be enjoyed in comfort in the open. The guests dispersed about 6 o'clock with many pleasant memories of their visit.—H. WILLOUGHBY-ELLIS (*Hon. Secretary*).

OBITUARY.

Dr. P. LACKSCHEWITZ.

THROUGH the death of Dr. Paul Lackschewitz at his home in Libau on March 8th, 1936, those who, like the writer, had the privilege of personal acquaintance with him have lost a warm and valued friend. Others who knew only his writings will regret the passing of one who as an entomologist was not only a keen collector and an acute observer but also a first-rate draughtsman.

Dr. Lackschewitz was born at Rappin on April 21st, 1865, the son of a country doctor; two of his own sons are following the same profession. Very early in life he became deeply interested in natural history, this interest being developed and strengthened by the science master at his school in Dorpat (now Tartu), and by the many scientists and explorers whom he met at his grandfather's

house in the old university town. Among these latter was A. Th. von Middendorf, the famous Siberian traveller, a grand-daughter of whom later became Lackschewitz's first wife. While training to follow his father's profession, first in Dorpat and then in hospital in St. Petersburg, he took up botany as a hobby and formed a herbarium of Baltic plants. In 1884 he spent the summer at the biological station on Solowtzk Island in the White Sea, collecting marine animals for the Zoological Institute, as well as plants and insects for the Naturforscher-Gesellschaft in Danzig. After a short period as assistant in a hospital in St. Petersburg he settled as a practising doctor in Libau in 1892. In a brief autobiographical sketch (a copy of which Frau Lackschewitz has kindly sent me) he writes with rather evident regret that there now followed "a fifteen-year interruption of the research into our native fauna and flora". But if such research was his main interest in life, it must be said to his honour that he never, even in later years, allowed the needs (real or fancied!) of his patients to suffer through his scientific pursuits. Even in 1933 the delightful excursions which he arranged for me during a week's visit were dependent upon his being able to leave a colleague in charge of his practice.

Even during the period of "Berufsarbeit, fest in Sattel", he was able to add to his herbarium during holiday excursions around Libau and to the island of Oesel, and also to specialize in the study of the genus *Salix*, working out collections which were sent to him from various parts of the Russian Empire. In 1911 he undertook a journey to Novaja Zemlya, the Kola Peninsula and Lapland, in company with two Swedish salicologists, as a result of which he was able to study the arctic *Salix* flora in detail. Publication of his monographic works on the Palaearctic willows was delayed through the outbreaks of war and revolution, and his manuscripts still rest with the Russian Academy of Sciences at Leningrad.

Being perforce diverted from his botanical studies he turned to entomology. Commencing with Neuroptera and Trichoptera, he published a list of the East Baltic species of these Orders in 1922, and then turned his attention to the Diptera. In the Tipulidae he found a field of research which occupied his leisure for the rest of his life. He issued a score of publications on the craneflies, based partly on his own collecting and partly on material sent him for determination, including the extensive collections of the Vienna and Leningrad Museums. The excellence of his work in this field won him speedy recognition, and he was offered and accepted the task of preparing the section on Limoniinae for Dr. E. Lindner's monumental work, *Die Fliegen des palaearktischen Region*—a task which he was unfortunately unable to complete. His personal collection of craneflies, including the types of the fourteen new species discovered by himself, was bequeathed to the British Museum.—F. W. E.

WE deeply regret to record the death of Dr. RAFFAELLO GESTRO on June 6th, 1936.—ED.

THE ENTOMOLOGIST.

VOL. LXIX.]

SEPTEMBER, 1936.

[No. 880

NOTES ON LEPIDOPTERA COLLECTED DURING 1935.

BY S. WAKELY.

DURING 1935 sundry excursions provided me with some interesting captures, and I have penned the following notes hoping they will be of interest to others.

On May 26th I was introduced to a locality where *Leucophasia sinapis* occurs, and it was a great pleasure to see this local butterfly on the wing for the first time. Larvae of *Thecla betulae* were widely distributed in this locality, but very small, and not plentiful. A few larvae of *Eriogaster crataegi* were also beaten, and a specimen of the beautiful *Pyrausta octomaculata* netted. *Chlidonia baumaniana* was also taken.

Larvae of *Strymon w-album* were beaten off wych elm in the Croydon district on May 12th. It was an agreeable surprise to take this species so near London. On June 1st, at Brentwood, Essex, the larvae were really common. I do not remember seeing this given as one of its localities before. Can it be that this butterfly is more widely spread than usually imagined? I would suggest that a search (by beating) of wych elm in other localities during the last fortnight in May would produce interesting results. When beating for *S. w-album*, the larvae of both *Orthosia gilvago* and *Eucosma trimaculana* occurred near Croydon.

Larvae of *Oxyptilus heterodactylus* were found on *Teucrium scorodonia* at Boxhill, Surrey (May 11th) and Broadwater Forest, Sussex (June 16th). The drooping plants (caused by the larvae eating a small hole in the stems, thus interfering with the normal flow of sap) are very characteristic, and I was pleased to take this species at last, thanks to hints about what to look for given by old writers, to whom we owe so much. *Limenitis camilla* turned up at Boxhill in July, together with *Eumenis semele*. *Hesperia comma* was flying in fair numbers on July 28th, and a specimen of *Pammene fimbriana* was taken on March 31st. Larvae of *Lathronympha hypericana* were found in numbers spun up among the seeds of *Hypericum* (July 28th). It was a change to breed this instead of *Depressaria hypericella*, which has hitherto rewarded all my efforts to rear the former insect.

From seedheads of *Silene inflata* and *Lychnis dioica* collected at Chalfont, Bucks, on June 30th, 1934, a number of *Harmodia nana* were bred during the summer, together with *H. capsicola*, *H. carpophaga* and *Eupithecia venosata*. *H. nana* proved to be commonest—a welcome surprise as I had not taken this species

previously. At Woodford, Essex, on June 9th larvae of *Anarsia spartiella* were swarming in spun shoots of gorse, but the majority were parasitized, and only three imagines were bred. The larvae of *Phalonia smeathmanniana* were found in March in the matted old seedheads of Yarrow at Ashtead, Surrey. The moths emerged at the beginning of June.

Some larvae which puzzled me were found in the shoots of *Centaurea nigra* at Chilworth, Surrey, on May 19th. These fed on the pith of stems, causing the tips to turn brown, these shoots being usually hidden by the quick growth of the other healthy stems. Pupation took place in a silky cocoon within the stem, and the moths emerged in June, proving to be *Euxanthia straminea*, which is said to feed on the flowers. On July 14th a visit to Benfleet, Essex, produced a specimen each of *Eucosma citrana* and *Nemotois fasciella* among a number of more common species.

A few days at Easter were spent at Burnham-on-Crouch, Essex, and various dead stems and roots of plants were collected with the object of breeding moths therefrom later. On the land side of the sea-wall to the east of the town I found a clump of hemlock (*Conium maculatum*). There were a few of the dead stems left from the previous year, and from these I bred a small series of *Lozopera beatricella*. Larvae of *Aristotelia brizella* were found in matted seedheads of sea-lavender; any number could have been taken as almost every stem of seeds sheltered a larva. Some of the books give sea-thrift as the food-plant, but I have never met with it on this. *Phalonia affinitana* was bred in great variety from stems and roots of sea-aster. This plant is particularly obnoxious when pulled up from the evil-smelling mud, and looks very unpromising material to breed moths from. *Phthorimaea obsoletella* were bred from dead stems of *Atriplex (littoralis ?)*. Two small *Gelechids* bred from a mixture of stems taken on the salterns were determined by Mr. F. N. Pierce as *Aristotelia suffusella*. These were much darker than normal specimens, and I think it most likely they emerged from stems of *Scirpus triquetus*.

A fortnight was spent in the Isle of Wight during August, and some nice species taken. *Polygonia c-album* was seen on Combley Down flying over the local woolly-headed thistle (*Cirsium eriophorum*) and larvae were beaten at Parkhurst Forest (on wych elm) and Appleford Wilderness (on willow). *Bryophila muralis* (one) was taken on the oak fence at Osborne. A few larvae of *Alispa angustella* (a new record for the Island) were found on spindle (*Evonymus europaeus*) berries on Combley Down, and *Peronea logiana* was bred in numbers from leaves of *Viburnum lantana* taken at the same place. Larvae of *Pterophorus carphodactylus* were found plentifully in flowers of *Inula conyza* on Mersley and

Ashey Downs, and a few odd ones were taken in the low shoots feeding in the manner of the spring brood. The finding of the larvae in such numbers in the flowers is of great interest, as many as half a dozen being found in the flowers on one stem. Parkhurst Forest yielded: *Smerinthus ocellata* (larvae not uncommon on willow), *Cerura furcula* (larvae on willow), *Hysterosia inopiana*, *Peronea hastiana* and *P. boscana* (larvae on willow and elm respectively), *Gelechia lentiginosella*, *Depressaria atomella*, *Aegeria flaviventris* (galls on willow), *Leucoptera waillesella* and *Tinea corticella*. Mr. H. G. Jeffery also took *Peronea cristana*, and has since reported that the galls caused by *Aegeria flaviventris* are more common than he has seen them before. Several visits were made to the banks of the River Medina at Whippingham (Folly), where specimens of *Phalonia vectisana* were taken, together with *Eucosma aemulana* Schläg, *Pammene spiniana*, *Phthorimaea seminella*? (larvae on seeds of *Atriplex hastata*), and *Coleophora annulatella* Tengst. (teste F. N. Pierce). Other species taken were *Semiothisa clathrata* (ab. *nocturnata* Fuchs), *Mompha schrankella*, and *Choreutis myllerana*—at Appleford Wilderness; *Epermenia chaeriphylla*, larvae on *Heracleum spondylium* at Chillerton.

With reference to a note of mine in the *Entomologist* (68: 64) about the Field Cricket, Mr. Jeffery reports that he dug one out on the Downs near Arreton, I.W., in the spring, but the species seems to be at a very low ebb. It is likely that the kestrel is playing its part in exterminating this interesting cricket. These birds have increased greatly in recent years owing to less attention from gamekeepers. By the frequent stoops they make to the ground there is little doubt but that insects form their chief prey—grasshoppers and crane-flies most likely.

In conclusion, the larvae of *Alispa angustella* were again found in berries of spindle at Selsdon, Surrey, in October. The berries were collected in a linen bag, and no larvae were observed at first in spite of a careful search. Several berries were seen with holes in them, but on opening these no larvae could be seen, but on examining the bag some weeks later about 10 were found spun up in folds of the bag in dense white cocoons. It is curious how a larva of this size hides itself in the berries so successfully.

4, Auckland Road,
S.E. 19.

EARLY EMERGENCE OF SCOLIOPTERYX LIBATRIX.—A larva of *S. libatrix*, beaten from willow in late June, pupated on July 1st, and the perfect insect emerged on July 15th, which is, I believe, an early date for this species.—WILLIAM E. BUSBRIDGE; "Gresham", Bradbourne Park Road, Sevenoaks, Kent.

TOBAGO AND ITS BUTTERFLIES.

BY W. G. SHELDON.

TOBAGO, one of the lesser West India Islands, is about 27 miles in length and $7\frac{1}{2}$ miles in breadth at its widest point; it has an area of approximately 116 square miles, which is about three-fourths the size of the Isle of Wight. The population is 27,000; of these about one hundred are whites, almost entirely planters, the remainder being coloured people, mainly of African origin, but with a few Chinese and East Indians.

The island lies some eighteen miles north-east of Trinidad, in the latitude of about 11° north. It is approached from the Port of Spain by local steamers, sailing three times a week; the voyage of 80 miles takes place in the night and occupies about nine hours.

Tobago is one of the fairest of the beautiful West Indies, and situated as it is out in the Atlantic and subjected to the influence of the delicious north-east trade wind, the climate is delightful. Extreme heat is not experienced except in one or two summer months, the temperature during the winter rarely much exceeding 80° F.

The island is situated outside the hurricane zone, and apart from tropical showers, bright and sunny days are the rule.

Tobago is almost entirely covered by wood, largely plantations of cocoa and cocoa-nut, but there are extensive areas of native wood. On the north side there is a tract of over 7000 acres of virgin forest, which has been constituted a State reserve. Altogether there are about 20,000 acres of uncultivated land.

The surface, except for the region around Scarborough, is almost entirely composed of hills and valleys, the highest point, Pigeon Peak, reaching an altitude of 1890 ft. A central ridge runs from the north end for two-thirds of the island's length; intersecting this there are numerous cross ridges at approximately right angles to it, each one having a valley on either side, with a stream at the bottom.

The coast-line is extremely picturesque, consisting of a series of beautiful bays, with steep rocky shores and sandy beaches, shaded by cocoa-nut palms and other tropical growth; bathing is almost everywhere excellent and safe.

Tobago is, of course, the island Defoe had in mind when planning Robinson Crusoe, though part of his story was obtained from Alexander Selkirk, who was marooned at Juan Fernandez in the Southern Pacific several thousand miles away.

Visitors can stay at Scarborough, the small town at the

south-west end of the island where the ships call, and where there is a comfortable hotel, or they can take a car along the extremely beautiful south coast road to Speyside at the north-east end, the scene of my sojourn. Here there is a delightfully situated private hotel, formerly a planter's residence, where one is made extremely comfortable. The hotel is situated on a knoll a stone's throw from the sea, open to every breath of the trade wind, and possessing a perfectly safe and ideal bathing beach.

Just off the coast and in full view of the hotel is the small island of Little Tobago, some three miles away, now a bird sanctuary, inhabited by Frigate Birds, Brown Pelicans and many other tropical species, including numbers of the large Bird of Paradise, introduced from the East Indies many years ago by a former owner.

An island situated within 20 miles of Trinidad, which has more than 600 species of Rhopalocera, and that was at one time in all probability joined to it, must itself obviously possess a considerable number. From the sources at my disposal I have compiled a list of 102 species, but I am quite confident the island's butterfly fauna consists of many more than this, and that an energetic resident collector could certainly add largely to the number. At present only about half a dozen localities have been investigated for a few days or weeks in the year.

The earliest visit of a lepidopterist of which there is a record was made by the late G. B. Longstaff, who spent eight days, April 3rd to 10th, 1907, in Tobago, three of these at Cocoa Wattie, near the centre of the island, and the other five on the coast in the neighbourhood of Scarborough. A paper describing his visit and captures is to be found in the *Transactions of the Entomological Society*, pp. 53-57. Twenty-eight species are enumerated.

The only other visitor who has published any notes is Sir Norman Lamont, who, with the late Sir Gilbert Carter, stayed at Tobago from August 14th to 23rd, 1917. An account of this visit is published in the *Proceedings of the Agricultural Society of Trinidad and Tobago*, October, 1917, pp. 400-402. Twenty-eight species were met with, of which sixteen are not included in Longstaff's list.

Mr. W. J. Kaye, during one of his visits to the West Indies, spent from January 18th to February 4th, 1926, in Tobago, principally at Bacolet, meeting with thirty-four species.

Following Mr. Kaye, Mr. A. Hall visited Tobago, staying at Speyside from February 6th to 16th, 1932; during this period he captured or observed fifty-two species.

My sojourn at Speyside from December 17th to January 17th last resulted in the identification of sixty-four species.

Whilst staying there I made the acquaintance of Master Frank Dabadie, the son of a planter residing at Roxborough, some miles

west of Speyside, who had collected a number of butterflies and who brought a case of them for my inspection. Amongst these were several very interesting species, including an example of *Prepona laertes demodice*, ♀, and one of *Papilio androgeus*.

Speyside, in addition to being extremely beautiful, is undoubtedly very favourably situated as a locality for Lepidoptera. The broken hilly character of the surroundings and the thick woodlands, both primeval and secondary, conduce to this; out of 101 species included in the following list 72 were observed at Speyside by Mr. Hall or myself.

Around the hotel there is a clearing of several acres, with sunny banks and many flowers that are attractive to Lepidoptera. Here there were always great numbers of specimens, and many species of Hesperids, Lycaenids and Theclids, with wild-flying Catopsilias and others.

Another good locality was the coast tract to the north-east as far as Ageuza Bay, a distance of about two miles.

Shortly before reaching the hotel the road from Scarborough takes a sharp turn to the north and winds up the hill until it reaches a col with an altitude of about 800 ft., from which there is a fine view of Charlotteville and Man of War Bay on the opposite coast. Then one can turn to the left by a path leading to Pigeon Peak, or to the right along what is known as Observatory Road. Several interesting species occur here that are not met with elsewhere.

One of the most beautiful woodland walks is to take the coast path from the hotel for about half a mile, and then to turn up the hill to the left, where one passes through some virgin forest, and after this traverses a cocoa plantation the property of the proprietor of the hotel on the left, with secondary forest on the right. By following this path for a mile or more the collector comes out in Observatory Road and can return to the hotel by the Charlotteville Road. Several butterflies were found here exclusively.

In Tobago, except in the case of a few species, such large numbers of individuals as are met with in Trinidad or on the mainland of tropical America do not exist, and it is noticeable that of a large proportion of the species only single examples are seen or captured in the course of several weeks' collecting.

It is my pleasant duty to thank cordially Sir Norman Lamont, Messrs. Hall, Kaye and Dabadie for furnishing me with lists of their captures, Messrs. Hall and Kaye for assistance in naming certain species, and Mr. Riley, Mr. A. G. Gabriel and Brigadier W. H. Evans for naming many species I was unacquainted with, from the National collection.

Danaus plexippus, Linn.—Scarborough, rather common, Cocoa Wattie, one (G. B. L.), Scarborough (Sir N. L.), Speyside (A. H.).

Ithomia drymo pellucida, Wey.—Rare, Roxborough (F. D.). Longstaff had specimens given to him which were taken at Cocoa Wattie.

Pteronymia asopo, Feld.—Only recorded by Longstaff, who had specimens given to him from Cocoa Wattie.

Heliconius melpomene euryades, Riff.—Not common; Speyside (A. H. and W. G. S.), Roxborough (W. J. K.).

H. erato hydara, Hew.—Locally common. This and the preceding species invariably fly together in Tobago, as in other places; obviously a case of mimicry, the latter being the model and the former the mimic. Both represent races much smaller than Trinidad specimens. Speyside (A. H. and W. G. S.). Taken in several localities (W. J. K.).

Eueides aliphera, Stich.—Rare; I saw three or four specimens in all and captured one. Mr. Hall also records it from Speyside; Charlotteville (Sir N. L.).

Colaenis julia, Fab.—Speyside; not common and difficult to capture (W. G. S. and A. H.).

Dione vanillae, L.—Not common; Speyside (W. G. S.), Bacolet (W. J. K.), Orange Hill (Sir N. L.).

Vanessa cardui, L.—Occasionally on migration; recorded from Roxborough (F. D.).

Anartia jatrophae, L.—Local; Scarborough (Sir N. L. and G. B. L.), Bacolet (W. J. K.). Apparently not occurring at the east end of Tobago.

A. amalthea, L.—Common throughout in damp wooded localities.

Precis genoveva, Cram.—Common and widely distributed.

Didonis biblis, Fab.—This conspicuous species, so abundant in Trinidad, appears to be very rare and local; only recorded from Speyside by Mr. Hall.

Cystineura cana, Erich.—Abundant everywhere.

Dynamine theseus, Feld.—Abundant everywhere.

D. mylitta, Cram.—Rare; Speyside (A. H. and W. G. S.), Scarborough Botanic Gardens (Sir N. L.), Bacolet (W. J. K.).

Aganisthos odius, Fab.—Taken at Speyside (A. H.). I saw one specimen in the Charlotteville Road, near Speyside Hotel.

Prepona antimache, Hubn.—Mr. P. L. Guptry informed me he saw one specimen at his plantation, Agenza, near Speyside.

P. laertes demodice, Godt.—Mr. F. Dabadie has a female specimen of this extremely beautiful species, taken near Roxborough. There is also a female in the National Collection at the British Museum that came from Trafalgar, Tobago. It was presented by G. H. Swarder (to whom Longstaff refers in his paper) in 1913. Whilst at Speyside I saw, in the hotel garden early one morning, a *Prepona* I have every reason to believe was this species. It flew slowly—for

a *Prepona*—to and fro, quite near where I was standing, at only few feet from the ground. It was of the size of *P. demodice* and flight was similar. Unfortunately my net was in the hotel, and when I had procured it the butterfly was gone. I searched and sugared frequently afterwards without result.

Morpho sp.—Longstaff writes: "Mr. Sworder showed me specimens of other butterflies which I did not happen on alive including *Morpho* sp." I have not been able to see a specimen of this intriguing species, but have no doubt of its existence and presume it is *M. achilles*, L., the only *Morpho* found in Trinidad.

I heard from several responsible residents of the occurrence of a large bright blue butterfly, which could only be a *Morpho*, and all of them agreed that its habitat is restricted to the ravine difficult of access on the northern coast, in the region of the forest reserve, which at present is practically without roads or place where a collector could stay.

The most definite information I obtained of its whereabouts came from F. Dabadie, who stated that the centre of its distribution was the forest-clad ravines from Castara Bay to Bloody Bay, some six miles apart.

Caligo braziliensis minor, Kaye.—Frequent at Speyside (A. H. and W. G. S.). I took two specimens flying at dusk and saw others at Roxborough (F. D.).

Taygetes echo velutina, Straund.—I found this species not uncommonly at an altitude of several hundred feet, a mile or so to the north of Speyside. It was confined to forest conditions, and on being disturbed retreated into thick growth, amongst which its capture was difficult.

T. andromeda, Cram.—Of the same habits and restricted to the same locality as the last species, but was much rarer. I only netted two examples and did not see others.

Euptychia hesione, Sulz.—Abundant throughout.

E. terrestris, Butl.—Only recorded by Sir Norman Lamont, without locality other than Tobago.

E. myncea isolata, Kaye.—Common at Speyside (A. H. and W. G. S.).

E. similis, Butl.—Common at Speyside (W. G. S.), Bacolet (W. J. K.).

E. hermes, Fab.—Abundant throughout.

E. junia, Cram.—I was shown specimens by F. D. which he stated had been taken near Roxborough.

E. libye, L.—Common at Speyside (A. H. and W. G. S.), Bacolet (W. J. K.).

Perophtalma tullius, Fab.—I only saw and captured one specimen, on the col between Speyside and Charlotteville; probably

the brood was not fully out, as Mr. Hall found it commonly; Bacolet (W. J. K.).

Lasaea meris, Cram.—The only specimen I have come across was in the collection of F. D., who informed me it was a Tobago example.

Lymnas xarifa, Haw.—I have the same observation to make of this species as of the last.

L. iarbas, Fab.—Apparently not common at Speyside (A. H. and W. G. S.), Bacolet (W. J. K.), Dunoos (Sir N. L.).

Mesene phareus, Cram.—Rare; only recorded by myself, a single specimen on each of two days, to the north of Speyside, at an altitude of about 300 ft.

Emesis progne, Godm.—Bacolet on flowers of *Eupatorium odoratum* (Christmas bush) (W. J. K.).

E. caeneos, L.—Speyside, common locally (A. H. and W. G. S.), Pembroke (Sir N. L.).

Theope virgilius, Fab.—Speyside, not common (A. H. and W. G. S.) Bacolet (W. J. K.).

Nymphidium calyce Feld.—Fairly common at Speyside (A. H. and W. G. S.), Botanic Gardens, Scarborough (Sir N. L.).

N. mesoleucum, Bates.—Speyside; one specimen captured near hotel garden (W. G. S.).

Chilades hanno Stoll.—Speyside; common in hotel clearing (W. G. S.), Bacolet (W. J. K.) one specimen east of Scarborough (G. B. L.).

Leptotes cassius, Cram.—Common at Speyside (A. H. and W. G. S.), Pembroke (Sir N. L.).

Callicista bubastus, Cram.—Speyside, frequent (W. G. S.), Scarborough (G. B. L.).

C. farnalis, Hew.—Speyside, one specimen (A. H.).

Tmolus crolus, Cram.—Bacolet, at flowers of *Eupatorium odoratum* (W. J. K.).

Calycopis beon, Cram.—Speyside, common (A. H. and W. G. S.), Bacolet, at *Eupatorium* (W. J. K.), Scarborough and Cocoa Wattie (G. B. L.).

C. hesperitis, Butl. and Druce.—Bacolet (W. J. K.).

C. palegon, Cram.—Speyside, not uncommon on flowers (A. H. and W. G. S.), Bacolet (W. J. K.).

C. spurina, Hew.—Speyside, two worn examples taken in hotel clearing (W. G. S.).

C. sangala, Hew.—Speyside; one female taken at *Eupatorium* flowers in a dell leading out of the Charlotteville Road, near Speyside Hotel, Bacolet (W. J. K.).

C. calus, Godt.—At about 1000 ft. on Smith's Estate, in centre of island (W. J. K.).

C. cyphara canus, H. H. Druce = *nubes*, Druce.—Bacolet, common at flowers of *Eupatorium* (W. J. K.). Longstaff writes of it under the name of *nubes* H. H. Druce, "one specimen at Scarborough, four at Cocoa Wattie at flowers of a pink creeper" (probably *Antigonon leptopus*—W. G. S.).

C. politis, H. H. Druce.—Cocoa Wattie, one female (G. B. L.).

Chalybs herodotus, Fab.—Bacolet, at flowers of *Eupatorium* (W. J. K.); specimens of *Chalybs* sp. having green undersides (probably this species) seen by A. H. and W. G. S. on the col between Speyside and Charlotteville.

C. simaethis, D. M.—Bacolet, at flowers of *Eupatorium* (W. J. K.).

Pseudolycaena marsyas, L.—Speyside, common (A. H. and W. G. S.), Bacolet (W. J. K.). This species is one of the few that is more abundant in Tobago than in Trinidad.

Amyntia maerula, Fab.—Speyside (A. H.). I did not see this large and conspicuous species; probably I was at Speyside at a date intermediate between two broods.

Catopsilia statira, Cram.—Speyside (A. H.).

C. eubule, L.—Speyside (A. H. and W. G. S.); very abundant around the hotel and elsewhere in the neighbourhood, but owing to its wild flight difficult to capture; Scarborough, abundant (Sir N. L. and G. B. L.).

Phoebis agarithe, Boisd.—Reported from all districts. Common around the hotel at Speyside.

T. westwoodii, Boisd.—Longstaff writes: "The Hope Collection [at Oxford] has *Terias westwoodii* from Tobago."

T. albula, Cram.—Speyside, common (A. H. and W. G. S.), Pembroke (Sir N. L.), Cocoa Wattie and Scarborough (G. B. L.).

T. elathea, Cram.—Scarborough (Sir N. L.).

T. leuce athalia, Feld.—Speyside, common (A. H. and W. G. S.); not reported from elsewhere.

T. venusta, Boisd.—Common everywhere. This is the species named *nise*, Cram., of Kayes' *Catalogue of Trinidad Rhopalocera*. Mr. Hall informs me (*in litt.*) that when recently rearranging *Terias* in the National Collection he found Boisduval's type, and that *T. nise* Cram., is not found in any of the West India islands.

Pieris monuste, L.—Speyside (A. H.), Scarborough (Sir N. L. and G. B. L.).

Papilio polydamas, L.—Speyside, common (A. H. and W. G. S.), Charlotteville (Sir N. L.), Roxborough (W. J. K.). I found a small batch of larvae feeding on *Aristolochia* and reared a specimen.

P. androgeus, Cram.—A specimen in the collection of F. D., who informed me it was captured in Tobago.

Mysoria venezulae, Scud.—Speyside; I saw two examples of this beautiful species (one of which was captured) in virgin forest;

reported also by A. H., Bacolet on *Eupatorium* (W. J. K.), one at Cocoa Wattie (G. B. L.).

Eudamus proteus, L.—Speyside, common (A. H. and W. G. S.), common everywhere (Sir N. L.).

E. catillus, Cram.—Speyside (A. H. and W. G. S.), one near Scarborough (G. B. L.).

E. simplicius, Stoll.—Speyside, common (A. H. and W. G. S.); one bred from larva found on low shrub growing on the seashore; common in all localities (Sir N. L.).

E. eurycles, Latr.—Speyside (W. G. S.), common in all localities (Sir N. L.).

E. aminias, Cram.—Speyside, one specimen (W. G. S.), reported also by A. H.

E. octomaculata, Sepp.—Speyside, one specimen (W. G. S.).

Achlyodes fredericus, Hb.—Speyside, not common (A. H. and W. G. S.).

Pellicia bessus, G. & S.—Bacolet (W. J. K.).

Systacea erosa, Hb.—Cocoa Wattie, one specimen (G. B. L.).

Spialia syrichtus, Fab.—In Tobago, as elsewhere in the West Indies appears to be universal. Common at Speyside.

Thymelicus vibex, Hb.—Charlotteville (Sir N. L.).

Calpodetes ethlius, Cram.—Bacolet, bred from larva feeding on *Canna*, sp. (W. J. K.).

Prenes nyctelius, Latr.—Speyside, one specimen taken in the hotel clearing (W. G. S.).

P. sylvicola, H. S.—Speyside (A. H.).

P. ocola, Edw.—Speyside, recorded by A. H.; one specimen only taken by W. G. S.

Lerodea tripuncta, H. S.—Speyside, not uncommon (W. G. S.).

Vacerra litana, Hew.—Speyside (A. H.).

Chiomara (Niconides) gesta, H. S.—Speyside, not uncommon (W. G. S.).

Rhinthon bistrigula, H. S.—Bacolet (W. J. K.).

R. chiriquensis, Mab.—One example, at an altitude of about 400 ft. at the back of Agenza, near Speyside (W. G. S.). This species somewhat resembles *Cydrus naevolus*, the type of which is in the National Collection in the British Museum. It occurs in Trinidad, from which Mr. Kaye has specimens, as well as in Tobago. There are examples of it in the National Collection.

Mnastheus simplicissima, H. S.—Speyside, common around the hotel (A. H. and W. G. S.).

Megistias epiberus, Mab.—Speyside, common around hotel (A. H. and W. G. S.).

M. telata, H. S.—Bacolet (W. J. K.).

M. cortica, Plötz.—Speyside (A. H.), Cocoa Wattie, one (G. B. L.).

Carystus fantasos, H. S.—Speyside; both Mr. Hall and I found this species about a mile north of the hotel, amidst forest surroundings.

Cynaenes pericles, Mösch.—Speyside, not uncommon round the hotel (W. G. S.).

C. silius, Latr.—Cocoa Wattie, one specimen (G. B. L.).

Epeus veleda, G. & S.—Cocoa Wattie, one specimen (G. B. L.).

Callimormus corades, Feld.—Speyside, not uncommon around hotel (A. H. and W. G. S.), Cocoa Wattie, three specimens (G. B. L.).

C. juvena, Latr.—Speyside, one example (A. H.).

Thracides antoninus, Latr.—Speyside, one example in hotel clearing (W. G. S.).

Perichares corydon, Fab.—Speyside, one example in hotel clearing (W. G. S.).

West Watch,

Oxted;

July 26th, 1936.

EUCOSMA BRUNNICHIANA L.—In my paper on the variation of three species of *Eucosma* in vol. lviii of this magazine, p. 228, I state that as regards the grey type form of *E. brunnichiana*, "I doubt if it occurs in Britain; at any rate I have never seen an example of it". Since this was written the Rev. R. E. E. Frampton has shown to me a specimen of this form bred by him from larvae found at Halstead, Kent, in 1928. Mr. Frampton has generously added this to my collection.—W. G. SHELDON; July 26th, 1936.

MACROGLOSSUM STELLATARUM AT HASTINGS.—In spite of the general scarcity of this species reported last month, I observed an amazing concentration of hundreds which appeared between 8 and 9.30 p.m. on June 24th, in my garden at St. Leonards-on-Sea, hovering over a patch of *Kentranthus ruber*. There was no mistaking the species, and the immigration does not appear to be connected with the mass arrival of *Plusia gamma* recorded at this period. As the Hawk Moths are generally seen singly or in small groups in the British Isles, such as are now being reported even for this species, an unusual migration in a flock formation appears to be indicated, and it will be of interest to know if this swarm is recorded elsewhere before dispersal. They all disappeared next day without the direction of flight being ascertained. The weather was warm and sultry with light southerly airs at the time.—J. R. LeB. TOMLIN; 23, Boscobel Road, St. Leonards-on-Sea, Sussex.

[I have discussed this observation in correspondence with Mr. Tomlin, who is convinced that the species was *M. stellatarum* and not *Plusia gamma*, both of which he knows well. It is odd that, apart from this very unusual occurrence, *M. stellatarum* has hardly been observed at all this year.—ED.]

NOTES ON BRACONIDAE: XV.—MICROGASTERINAE.

BY CLAUDE MORLEY, F.R.E.S., F.G.S., F.Z.S.

(Concluded from p 191.)

1. *Microgaster posticus*, Nees.—A large number were bred, with three *Apanteles tenebrosus*, Wesm., from a couple of cocoons of *Porthesia chrysorrhoea*, Linn., at Lichfield during August, 1900 (Mrs. Redmayne). One ♀ reared at Enfield, London, on June 4th, 1914, was thought to have emerged from the beetle *Cis boleti*, Scop., doubtless erroneously (Pool). Not rare at Monks Soham in Suffolk, both upon house-windows and sitting on the underside of lime leaves in garden, always in August.

2. *M. flavipes*, Hal.—Some 70 emerged on June 26th, 1880, from a semicircular wall of their own interwoven cocoons beneath a larva of *Boarmia repandata*, found upon a twig on 11th inst. by G. F. Mathew (at ? Dovercourt; *Entom.*, 13: 244, fig.); of these, 6 are in my collection. Five were bred from a dozen of their cocoons, raised from *Bombyx neustria* from Bungay, Suffolk, on August 8th, 1900 (G. W. Clutten); "Also from *Amphipyra pyramidea*, L., by Dr. Chapman" (Marshall's MS.). I have seen none wild.

3. *M. minutus*, Reinh.—Eight ♀♀ that emerged in August, 1923, the compact and oblong wall of their dirty-white cocoons, and the deflated larva of *Cleora jubata* that was found "brooding" over that wall, were sent me from the New Forest (E. E. Green). Apparently never yet found wild.

4. *M. suffolciensis*, Morley.—The androtype in my collection ("♀" sic: *Ent. Mo. Mag.*, 1902, p. 4) was bred on October 7th, 1899, from a larva of *Nothris verbascella* at Bury in Suffolk (Norgate). Two ♀♀, which undescribed sex differs merely in its genital organs and shorter antennae, were raised on May 30th, 1903, from *Nothris verbascella* at Locarno in Switzerland; and 13, comprising both sexes, emerged from their own solitary, pure white and cylindrical cocoons of 5 by 1½ mm. from *Hastula hyerana*, *Staud. Cat.* 1500, at Taormina in Sicily during April, 1905 (Dr. T. A. Chapman). I have seen no second British example during the past thirty years.

5. *M. wesmali*, Ruthe.—"Angleterre" simply (Marshall, *Bracon. d'Europ.*, 1: 522). The sole Britisher I have captured was a ♂ taken near Edwinstow in Sherwood Forest, Notts, on August 10th, 1914. Both sexes have been sent me, bred from *Hypotia corticalis*, at Hyères in south France on March 29th and April 16th, 1904 (Chapman).

6. *M. marginatus*, Nees.—Apparently rare: I swept a single ♂ from a small birch bush in Tuddenham Fen, Suffolk, on June 19th, 1915.

7. *M. calceatus*, Hal.—“In England Raynor has obtained the ♀ at Brandon, June 16th, from *Thera variata*, Schiff.” (Marshall, 1885, p. 246); “bred also by Bignell from *Thera variata*, Schiff., May 31st, and by Billups from *Eupithecia virgaureata*, Doubleday” (Marshall’s later MS.). It is a common and solitary parasite of Geometrae; 1 ♀ from its own solitary, dirty-white cocoon attached to a pine pinnule, that had emerged from larva of *Fidonia piniaria* on September 21st, 1899 (R. M. Prideaux); 1 ♀ bred from its own solitary, flavidous-white cocoon attached to a pine pinnule, that had slain a larva of *Thera variata* in Delamere Forest during 1908, just out and very active on June 15th, 1909 (Mansbridge); 1 ♀ bred from its own solitary, dirty-white cocoon attached to a pine pinnule, ex *Thera variata* in New Forest in October, 1905, by Dr. Blair, who adds that only a single parasitic larva emerges from each *Thera*-caterpillar, shortly before spinning its cocoon; a ♂ captured at Romsey in Hants (Buckell; named “*Apanteles* sp.” by Mr. Lyle).

8. *M. connexus*, Nees.—Certainly rare on the wing is this “common parasite of *Porthesia similis*, Fues.”; I have seen but a single ♀, taken on July 12th, 1909, in the ingenious fly-trap in his Lyndhurst garden, New Forest, by the late Fred. C. Adams, who gave it me.

9. *M. tiro*, Reinh.—Bred from its own solitary and white cocoon of 4 by 1½ mm., out of *Cnephasia* sp. at Reigate in Surrey on June 29th, 1899 (Chapman). Captured at Greenings in that county during 1872 (Wilson Saunders); and by me during August at Henstead Marsh in Suffolk, but never commonly.

10. *M. russatus*, Hal.—Half a dozen examples were sent me from Linlithgow on August 11th, 1906, just captured there by William Evans; and I had supposed it likely to be essentially Scots, till at length I was so fortunate as to take a beautiful ♀ sucking the stylopods of Angelica-flowers in the Wade Marshes of North Cove in Suffolk on September 21st, 1922.

11. *M. rugulosus*, Nees.—The unpublished economy of this species has been discovered by Mr. Alfred Sich, who bred a good many specimens from *Hydrocampa nymphaeata*, Linn., at Richmond in Surrey on and about October 3rd, 1905. He tells me that “the host-moth is attached to species of the pond-weed *Potamogeton*, and its larva lives in a case in the water; the whitish and strong silken cocoon of the Braconid that is parasitic upon this larva, is found inside the host’s case, affixed to one of its walls.”

12. *M. scoticus*, Marsh.—I have seen no insects of this genus

with rough third segment and red tegulae. The type still remains unique: "Scotland".

13. *Microgaster pluto*, SP. NOV.—A dead-black, somewhat large species, with wings strongly clouded and only the legs partly pale. Head shining and finely punctate, with palpi black. Antennae immaculate, a little shorter than body; flagellum filiform throughout. Thorax immaculate, gibbous and stout; mesonotum and scutellum nitidulous, irregularly and somewhat deeply punctate; metathorax coarsely rugose throughout, longitudinally carinate down centre of disc. Abdomen immaculate, broad and basally roughly sculptured; basal segment entirely rugulose, shorter than broad, with its apical margin truncate; second segment shorter than first, rugulose and dull throughout; third nitidulous and very obsoletely punctate, not longer than second; remainder laterally compressed and shining; terebra distinctly exerted, fully as long as basal segment. Legs with all coxae and femora black; apices of front femora, anterior tibiae and metatarsi entirely, and basal two-thirds of hind tibiae, clear testaceous; hind legs stout, with both tibiae and metatarsi explanate. Wings so strongly infumate as to be entirely nigrescent; tegulae, stigma and nervures black; radial cell narrow; areolet stirrup-shaped and complete. Length, $3\frac{1}{2}$ mm.; ♀ only. A single ♀ occurred to me, sucking the stylopods of *Oenanthë crocata* flowers at Matley Bog in the New Forest early in July, 1930.

14. *M. sticticus*, Reinh.—"Angleterre" simply (Marshall). I possess several examples of both sexes from Milford Haven in early July, 1910 (H. W. Andrews); Tostock in Suffolk on July 20th, 1900 (W. H. Tuck); and have myself taken it on flowers in Barnby Broad there towards the end of August, 1898 (named by Marshall). It has been bred from a subcircular bundle of its own cocoons, enclosed in a nettle-leaf, from *Vanessa atalanta* at Reigate during July (Prideaux).

15. *M. novicius*, Marsh.—A ♀ occurred to me by sweeping marsh herbage at Brandon staunch in Suffolk on September 28th, 1907.

16. *M. subcompletus*, Nees.—Very common; a score bred from two bundles of their fluffy white cocoons in rolled nettle-leaves from larvae of *Vanessa atalanta*, Linn., at Ashford in Kent during 1906 (H. Wood). It occurs everywhere in marshy places, usually upon flowers and by sweeping, from June 9th to September 12th; Calbourn and Ventnor in Isle of Wight; Matley Bog in New Forest; Eaton in Norfolk; Louth in Lincs; Alderton, Southwold, Henstead, Monks Soham, Brandon, Mildenhall, etc., in Suffolk.

17. *M. globatus*, Nees.—Distinctly uncommon; the last species is usually mistaken for it (*cf.* Kirby and Spence, *Intro.*, 7 ed., 154).

Bred by Bignell from *Lithosia lurideola*, Zinck. (Marshall's MS.). I have it from Adams's fly-trap in New Forest, July 8th, 1909; from Henstead Marsh and on Angelica-flowers in marshes at both Claydon and Thorndon, in Suffolk, always in the latter half of August.

18. *M. tibialis*, Nees.—An abundant parasite on Tineae, Tortrices and small Geometrae, but I have seen none bred. Often copiously beaten from oak-boughs and seen on Angelica-flowers, house-windows, etc., from June 5th (though I swept it on March 29th, 1931, at Vence in the Alpes Maritimes, France) to September 5th. Kilmore, Armagh, in August, 1898 (Beaumont); Killarney in June, and Dalkey near Dublin in July, 1913 (Morley). Spalding and Louth in Lincs, June, 1912 (Elliott); Wicken in Cambs; Calbourn in Isle of Wight; Lyndhurst in New Forest; and all over Suffolk at Stanstead, Brandon, Monks Soham, Henstead, Lackford, Mildenhall, Winston and Onehouse.

19. *M. hospes*, Marsh.—Not yet bred, and certainly uncommon; I have a very few examples from the sea-shore to east of Yarmouth in Isle of Wight, swept on June 20th, 1907; and on the sea-shore at both Southwold and Covehithe in Suffolk, early in the following September.

20. *M. crassicornis*, Ruthe.—One ♀ bred from the accompanying solitary cocoon, which is dull white, very little woolly and 2 by fully 5 mm., from a *Depressaria*-larva feeding on *Senecio* in 1904, on the Continent (Chapman). It is not infrequently captured in both dry and marshy places, usually feeding on the flowers of *Heracleum*, *Angelica* and *Silene flavesceens*, from June 21st to September 13th; in Suffolk at Wangford near Southwold, Henstead, Oulton, Risby Heath and in my Monks Soham paddock.

21. *M. nobilis*, Reinh.—A single ancient, damaged and presumably British ♂ of this central and southern European species was added to our list by Mr. Lyle in 1926 (*Ent. Mo. Mag.*, 62 : 117), thought to have been captured many years ago in "the neighbourhood of York" and now in the collection of Dr. W. J. Fordham of Barmby Moor there. Nevertheless, the absence of its name from Mr. Lyle's later Catalogue of the British Braconidae (*Trans. Ent. Soc.*, 1933, p. 70), the more especially because it is duly entered in my own MS. catalogue that Mr. Lyle copied, suggests that he came to regard his own record as an error. Certainly I have not seen *M. nobilis*.

22. *M. spretus*, Marsh.—Doubtless rare; a single ♀, taken on the wing in Dr. F. H. Haines's wild garden in the New Forest at Linwood, near Ringwood, Hants, on July 20th, 1932, is the first British specimen to be localized; the species has not been yet recognized on the Continent.

23. *M. politus*, Marsh.—Probably as rare as the last, and

unknown on the Continent. All at present recorded of the species is the androtype that was captured in a wood at Nunton, Wilts, during 1884 (Marshall, 1885, p. 261); "both sexes bred solitarily by W. H. B. Fletcher out of *Argyresthia conjugella*, Zell., from Stornoway in the Hebrides" (Marshall's MS.); and a single example that I was so fortunate as to have swept from dwarf willow, *Salix repens*, Linn., which is not the food-plant of the above host, at Tuddenham Fen in north-west Suffolk on June 6th, 1910.

HYPERPARASITES AND COMMENSALS ENUMERATED IN THIS PAPER.

HYMENOPTERA.

Apanteles tenebrosus, Wesm.
Campoplegid.
Formica rufa, Linn.
Lissonotid.
Mesochorus facialis, Bdg.
M. olerum, Curt.
M. pectoralis, Ratz.
M. pictilis, Hlgr.
Microgaster suffolciensis, Morl.
Mymar crinsacri, Quail.
Pezomachus instabilis, Fst.
Prophanurus phalaenarum, Ns.

Pteromalus sp.
Sagaritis maculipes, Tsch.
Sigalphus pallidipes, Nees.
Spilocryptus sp.

COLEOPTERA.

Cis boleti, Scop.

HEMIPTERA.

Aphis crataegi, Kalt.

DIPTERA.

Tachinid fly.

LEPIDOPTEROUS HOSTS ENUMERATED IN THIS PAPER.

Synonymized by W. RAIT-SMITH, F.R.E.S., F.Z.S.

(Uniformly with *Trans. Ent. Soc.*, 1933, p. 134.)

RHOPALOCERA.

Pieris brassicae, Linn.
P. rapae, Linn.
Melitaea aurinia, Rott.
M. cinxia, Linn.
M. athalia, Rott.
Aglais urticae, Linn.
Vanessa atalanta, Linn.
Maniola jurtina, Linn.
Lycaena phlaeas, Linn.
Polyommatus icarus, Rott.
Aricia agesti, Schiff. ("Brown Argus").

HETEROCERA.

Sphingidae.

Smerinthus ocellata, Linn.
Mimas tiliae, Linn. (*Smerinthus tiliae*, Linn.).
Haemorrhagia fuciformis, Linn.
Hemaris fuciformis, Linn.).

Zygaenidae.

Zygaena filipendulae, Linn.

Arctiidae.

Nola cucullatella, Linn.
Lithostia lurideola, Zinck.

Hipocrita jacobaeae, Linn. (*Euchelia jacobaeae*, Linn.).
Archia caja, Linn.
A. villica, Linn.
Phragmatobia fuliginosa, Linn. (*Spilosomea fuliginosa*, Linn.).

Cossidae.

Phragmataecia castaneae, Hb. (*Macrogaster arundinis*, Hb.).

Lymantriidae.

Euproctis chrysorrhoea, Linn. (*Porthea chrysorrhoea*, Linn.).
Porthea similis, Fuessl.
Stilpnotia salicis, Linn. (*Liparis salicis*, Linn.).
Dasychira pudibunda, Linn.
Orygia aurolimbata, Quen.

Lasiocampidae.

Malacosma neustria, Linn. (*Bombyx neustria*, Linn.).
Eriogaster arbusculae, Frr.
Macrothylacia rubi, Linn. (*Bombyx rubi*, Linn.).

Saturniidae.

Eudia pavonia, Linn. (*Saturnia pavonia*, Linn.).

Drepanidae.

Drepana lacertinaria, Linn.

Notodontidae.

Stauropus fagi, Linn.

Notodonta dromedarius, Linn.

N. ziczac, Linn.

Thyatiridae.

Palimpsestis duplaris, Linn. (*Oymatophora duplaris*, Linn.).

Noctuidae.

Acrionicta psi, Linn.

Diloba caeruleocephala, Linn.

Sideridis straminea, Tr. (*Leucania straminea*, Tr.).

Hyphilare lithargyria, Linn. (*Aletia lithargyria*, Linn.).

Arenostola brevilinea, Fenn. (*Noctua brevilinea*, Fenn.).

Archana geminipuncta, Hatch (*Nonagria geminipuncta*, Hatch).

Rhyacia pronuba, Linn. (*Triphaena pronuba*, Linn.).

Triphaena fimbria, Linn.

Amphipyra pyramidea, Linn.

Naenia typica, Linn. (*Mania typica*, Linn.).

Ceraapteryx graminis, Linn. (*Charaesus graminis*, Linn.).

Monima gracilis, Fab. (*Taeniocampa gracilis*, Fab.).

M. miniosa, Fab. (*Taeniocampa gracilis*, Fab.).

Sidemna fissipuncta, Haw. (*Agrotis ypsilon*, Rott.).

Ipimorpha obtusa, Fab. (*Tethea subtusa*, Fab.).

Epia irregularis, Hufn. (*Dianthoecia irregularis*, Hufn.).

Harmodia bicurris, Hufn. (*Dianthoecia capsicola*, Esper.).

H. rivularis, Fab. (*Dianthoecia cucubali*, Esper.).

Polia oleracea, Linn. (*Hadena oleracea*, Linn.).

P. pisi, Linn. (*Melanchra pisi*, Linn.).

Abrostola tripartita, Hufn. (*Abrostola urticae*, Hb.).

Dichonia areola, Esper. (*Xylocampa lithoriza*, (Bork.).

Gonospileia mi, Clerck. (*Euclidia mi*, Clerck.).

Ophiura cracca, Fab. (*Toxocampa cracca*, Fab.).

Geometridae.

Phalaena syringaria, Linn. (*Pericallia syringaria*, Linn.).

Biston betularia, Linn. (*Amphidasis betularia*, Linn.).

Boarmia jubata, Thnbg. (*Cleora jubata*, Thnbg.).

B. repandata, Linn.

B. rhomboidaria, Schiff.

Hipparchus papilionaria, Linn. (*Geometra papilionaria*, Linn.).

Speranza limbaria, Fab. (*Fidonia limbaria*, Fab.).

Bupalus piniaria, Linn. (*Fidonia piniaria*, Linn.).

Abraxas grossulariata, Linn.

Erannis defoliaria, Clerck. (*Hybernia defoliaria*, Clerck.).

Eupithecia helveticaria, Bdv.

E. castigata, Hb.

E. virgaureata, Dbl.

Thera variata, Schiff.

Eulype hastata, Linn. (*Melanippe hastata*, Linn.).

Euphyia cuculata, Hufn. (*Anticlea sinuata*, Hb.).

Calocalpe undulata, Linn. (*Scotosia undulata*, Linn.).

Chesias rufata, Fb. (*Eucestia rufata*, Fb.).

Pyralidae.

Hydrocampa nymphaeata, Linn.

Hypotia corticalis, Schiff.

Crambidae.

Chilo phragmitellus, Hb.

Pterophoridae.

Platyptilia rhododactyla, Fab.

P. acanthodactyla, Hb.

Pselnophorus brachydactylus, Treits.

Stenoptilia zophodactyla, Dup.

S. pterodactyla, Linn. (*Pterophorus pterodactylus*, Linn.).

Tortricidae.

Epagoge hyperana, Mill. (*Hastula hyperana*, Mill.).

Polychrosis littoralis, Curtis (*Sericosis littoralis*, Curtis).

Evetria sylvestrana, Curtis (*Retinia sylvestrana*, Curtis).

? "*L. paucillimana*," Chapman.

Tineidae.

Hyponomeutidae.

Swammerdamia carsiella, Hb. (*Swammerdamia spinella*, Hb.).

Gelechiidae.

Gelechia pinguinella, Tr.
Anacampsis populella, Clerck. (*Gelechia populella*, Clerck.).
Nothris verbascella, Hb.
Scythris senescens, St. (*Butalis senescens*, St.).

Glyphipterygidae.

Acrolepia pygmaeana, Haw.

Argyresthiidae.

Argyresthia conjugella, Zell.

Gracilariidae.

Ornix betulae, St.

Elachistidae.

Epermenia chaerophyllella, Goeze
 (*Epermenia chaerophyllella*, Goeze).
Elachista megerella, St. (*Elachista adscitella*, St.).
E. gleichenella, Fab.

Lithocolletidae.

Lithocolletis lantanella, Schr.
L. vacciniella, St.
L. messaniella, Zell.
L. spinicolella, Zell.

Nepticulidae.

Nepticula basiguttella, Hein.
N. septembrella, St.
N. trimaculella, Haw.
N. betulicola, St.
N. aurella, St.

NOTES AND OBSERVATIONS.

ARGYNNIS PAPHIA AB. VALESINA IN KENT.—While collecting in the mid-Kent woods yesterday I had the pleasure of seeing a fine specimen of this butterfly feeding from a bramble blossom. I did not catch it as I thought it would be more interesting to see next year whether it had established itself.—L. W. NEWMAN, F.R.E.S.; The Butterfly Farm, Bexley, Kent, July 17th, 1936.

NYMPHALIS POLYCHLOROS IN SUFFOLK.—This species occurred in some numbers this spring in a large wood in S.E. Suffolk. A female was captured on April 10th, while feeding at sallow bloom, but proved to have already laid most of its eggs.—W. S. GILLES; Bocking, Braintree.

COLIAS CROCEUS IN WALES.—With reference to *Colias croceus* (Fourc.) in Wales (cf. *Entom.*, 69 : 153), it appears to have been overlooked that I recorded its occurrence at Aberdaron, Carnarvonshire, in 1935, in the *North-Western Naturalist*. It was quite plentiful there during the first week in September, particularly on the clay cliffs and in fields and lanes close to the sea. On the more rugged north coast it was less common, but I saw a number at Porth Oer, which is of similar character to Aberdaron Bay, with meadow land and plenty of flowers. I saw one var. *helice*. I saw one a few miles west of Pwllheli, but they may have occurred in other places on the south coast which I did not visit. Many were perfect, others quite worn.—J. A. WHELLAN; 31, Chantrey Street, Liverpool, 7, August 10th, 1936.

NOTES ON POLYGONIA C-ALBUM L.—On May 3rd, 1936, near Llansarman, Denbighshire, I caught a rather worn female *c-album*. It was placed on nettle and fed on sugar solution and lived about four weeks. It laid fifteen eggs on May 21st and one, which did not

hatch, on May 31st. Two of the fifteen remained green, all the others developed, and nine hatched, the first on June 4th at 8-9 a.m. The caterpillars fed up in the usual way, six pupating, the first on July 4th, the last about July 9th. All the butterflies emerged by July 31st, the first two probably about July 26th while I was away. One of these is evidently a gynandromorph, female on the right, male on the left. The male side is smaller, darker, the black spots more pronounced, the under wing much hairier and the indentations slightly more pronounced than the female, while on the underside the male side is brighter and the colour contrasts are considerably greater than the female. The other butterflies were males, three of them normal, but the other two showing a peculiar minor variation. It is a scaleless spot on the fore wing, a little before the end of the cell. In the other specimen it is a little smaller and has in it a few fulvous scales. There is no corresponding modification on the underside of the wings. The original female seemed quite normal.—J. A. WHELLAN; 31, Chantrey Street, Liverpool, 7, August 10th, 1936.

MIMAS TILIAE IN STAFFORDSHIRE (*Entom.*, 69 : 191).—As a supplement to the above note, I may say that here, on the Staffordshire-Shropshire border (Forton being in the former county), and some twenty or more miles further north than Willenhall, I dug twelve pupae of *tiliae* in the autumn of 1934, five at lime, five at elm and two at alder (no lime or elm near). These produced five (dark) imagines during June 8th to 14th, 1935, and descendants emerged this year as early as May 26th. I put out on neighbouring trees quite a large number of larvae obtained by pairing two of them.—E. S. LEWIS; Forton Rectory, Newport, Shropshire.

PIERIS MANNI MAYER, AUTUMN FORM, AT MENTON.—On October 17th, 1929, I took casually what on the wing seemed merely one of the then abundant *P. rapae*, but found I had got a *Pieris manni* female—on close inspection quite different from *rapae*. The previous day, the first after a longish absence, I had unfortunately neglected the apparent *rapae* about in abundance, for the weather now became very windy and wet, so that what *manni* were not killed off were badly worn, although *rapae* continued in good condition for about three weeks longer. From October 17th to 24th I took 4 worn males and 4 fair and 2 very worn females of *Pieris manni*, and none later. In the field the males are not easy to distinguish from *rapae* males, having large black markings.

The following points seem to me to distinguish *manni* (autumn form) from *rapae*:

1. Fore wings proportionately broader.
2. Termen of fore wing more convex.
3. Black markings more diffuse, the apical markings being extended along termen.
4. The black discal spot on fore wing is large and square rather than round; and on the underside is very much larger than the spot in interspace 1 than it is in *rapae*.

5. Black fringes at termination of veins of hind wing above in some specimens. Mr. Riley drew my attention to the fact that—

6. Fore-wing cell is rather wider in proportion to its length in *manni* than in *rapae*; and that—

7. The origin of vein 7 on the hind wing is further from that of vein 6.

8. Membrane of the wings when denuded of scales is seen to be almost colourless in *manni*, whereas in *rapae* it is a pronounced green.—Lt.-Col. PEILE; Menton, November 17th, 1929.

FOOD-PLANT OF TYRIA JACOBÆÆ.—With reference to Mr. A. A. W. Buckstone's note (*Entom.*, 68 : 188), two years ago I found three or four Cinnabar larvae in my garden at Belford Vicarage, Northumberland, feeding on groundsel. I had never before seen the larva on anything but ragwort. Hardly twenty yards away, over a neighbour's wall, is a luxuriant patch of ragwort, which is never touched. In fact, I rarely see the moth away from the coast, and there it seems to be more or less localized. There is a half-mile stretch of sandhills in the next parish where pretty nearly every plant of ragwort is defoliated by the larvae, whilst very few caterpillars are to be seen on our own two miles of sandhills.—Rev. J. E. HULL, D.Sc.; Belford Vicarage, Northumberland.

SOUTHERN FORMS OF EUCOSMA SOLANDRIANA.—From 1928 to 1934 I bred as many larvae of this species in West Kent as time and opportunity allowed. In 1928, 1929 and 1932 they were fairly plentiful; in other years scanty. This year, in East Sussex, they were very scanty, and I only found seven by almost continual searching, which is possibly due to the frost in mid-May last year. My notes show that the total to date is 240, composed as follows: Form *solandriana*, 37, = 15%; form *parmatuna*, 12, = 5%; form *rufana*, 95, = 40%; forms *trapezana* and *griseana*, 96, = 40%. Most of these figures were compiled before form *griseana* was distinguished and named by Mr. Sheldon; hence the grouping of these last two forms. It may be added that the species seems to be remarkably free from parasites. Similar figures for *Eucosma brunswickiana* (= *sinuana* Hübn.) are too small to be worth quoting, but they indicate that the form *brunneacana* (without the white dorsal spot) is twice as frequent as the form *albodorsana*. Among those bred in West Kent is a form with grey ground-colour and with a white dorsal spot; this is referred by Mr. Sheldon to the type, hitherto believed to be only continental.—R. E. E. FRAMPTON; Crowborough.

HYPONOMEUTA MORELLA HB. SERIOUSLY DAMAGING WILLOWS IN SUFFOLK.—On June 26th an account was given me of the curious appearance of some willow trees off Beccles Common, and I set off to the spot. I found about thirty of these, which are white willows, covered with greyish-white web from the top to the bottom, including

the trunk and the herbage round the foot. Inside this web myriads of caterpillars were swarming, which had eaten every vestige of leaf from the trees. From a distance the trees looked as if covered with hoar-frost. I sent some caterpillars to the Natural History Museum and they said they thought the culprit was *Hyponomeuta rorella*, Hübn., and having had moths emerge they now confirm this identification, and say that previously the species has been reported only from Sussex and Dorset, where it is local and scarce. The infestation subsequently proved to extend for some miles in the direction of Lowestoft and Yarmouth, notably along the banks of the Waveney, so that it may now be stated to be found in north-east Suffolk and south-east Norfolk. Sporadic attempts, as for instance by Beccles Corporation, have been made to destroy caterpillars, but moths have, nevertheless, emerged in great numbers. I now understand that small companies of the larvae were noted as long ago as five years, that last year they had increased alarmingly at Worlingham near here, and they seem to be spreading every year. On July 19th pupation had generally taken place and moths started to emerge July 26th.—ERNEST T. GOLDSMITH; 58, Fair Close, Beccles, Suffolk.

CALLIMORPHA HERA AT EXETER.—On August 19th, 1935, a *Callimorpha hera* of the form *lutescens* flew round a house in Pennsylvania Park, settling at intervals on the walls, but not for long enough for me to be able to box it, having no net; it finally disappeared. This was about 2 o'clock p.m. A few minutes later I found that my sister had just captured a typical female. Both before and after the above date my sister has seen specimens on the wing, which were probably this species, but could not be caught for final identification. Such suburban records of *C. hera* seem worth making, although not far from its well-known habitat.—R. M. PRIDEAUX; Brasted Chart, near Sevenoaks, September 8th, 1935.

AMIOTA ALBOGUTTATA WAHLB. IN DORSET (DIPTERA, DROSOPHILIDAE).—On a visit to Studland Heath in August, 1935, Messrs. H. Edelsten and J. C. F. Fryer collected a quantity of the fungus *Daldidia concentrica* from burnt birches, for the purpose of rearing the moth which is associated with this fungus. Among his material Mr. Edelsten found several small dipterous puparia, which he carefully preserved. These hatched during June and early July, 1936, and proved, as anticipated by Mr. J. E. Collin, to be *Amiota alboguttata* Wahlb., a fly which has been taken but once or twice before in Britain and was previously unrepresented in the British Museum. *A. alboguttata* is a small black fly with snow-white spots on the shoulders and sides of thorax, a coloration by which it is easily recognized.—F. W. EDWARDS.

THE BRITISH SPECIES OF ILISIA (DIPTERA, TIPULIDAE).—*Ilisia* (or *Acyphona*) *maculata* Mg. is a common small crane-fly with beautifully mottled wings, the markings being described by Meigen and frequently referred to subsequently as "ocelliform". No

closely allied species has been described from Europe, and the species appearing very distinct and isolated no synonym has been proposed. I have for long noticed that the wing-markings are of two types, some specimens having the spots with lighter centres and others having them solidly dark; both forms are common and widely distributed. Suspecting that two species might be involved, I have mounted the male hypopygia of several specimens of each form, and find there are well-marked differences between them, clearly confirming my suspicion. For the species with "blind" dark wing-spots I propose the name *Ilisia occoecata* sp. n.; the type is a ♂ in the British Museum from Ffrith, Flintshire (F. W. E.), a locality where both species occurred. The hypopygia of both will be figured in a revision of the British short-palped crane-flies which is to be published at an early date by the Society for British Entomology.

Of the remaining British species of *Ilisia*, one name has been recorded in error and one addition has to be made. I recorded (*Ent. Mo. Mag.*, 62:32, 1926) a male from Nethy Bridge as *I. obscuripes* Zett.; this on re-examination proves to be merely an immature specimen of *I. melampodia* Lw. On the other hand *I. vicina* Tonn., a species not hitherto recorded from Britain, is represented in the British Museum by a male taken by myself at Temple Sowerby, Westmorland, in 1929.—F. W. EDWARDS.

ERIOPTERA RIEDELI LACKSCHEWITZ IN SCOTLAND: AN ADDITION TO THE BRITISH TIPULID FAUNA.—In June, 1931, I took at Nethy Bridge a blackish male *Erioptera* which was determined at the time as the common *E. fuscipennis* Mg. On re-examination, however, the specimen proves to be *E. riedeli* Lack., and therefore an addition to the list of British Tipulidae. The specimen agrees precisely with Latvian paratypes received from the describer; there is, however, a slight inaccuracy in the published figures as regards the form of the tip of the outer style.—F. W. EDWARDS.

TWO DIPTERA (PHORIDAE) NEW TO THE BRITISH LIST.—During May last I obtained short series of two species of Phoridae which appeared to be new to the British Museum collection, and which I failed to determine with the aid of Lundbeck's volume in *Diptera danica*. I therefore sent examples to my friend Father H. Schmitz, who has kindly determined them for me. The records are as follows: *Conicera tarsalis* Schmitz, Castle Naroche, Somerset, 12.v.1936, numerous about mossy base of a beech tree in woods below summit of hill (♂♂ only taken; Father Schmitz states that this is a spring species). *Megaselia pseudogiraudi* Schmitz, Farley Down, Hants, 20.v.1936, numerous in beech wood (♀♀ only taken).—F. W. EDWARDS.

EMPIDIDAE AT CHEDWORTH, GLOS.—A small collection of Diptera made at Chedworth, Glos, on July 5th, 1936, included several interesting species of EMPIDIDAE. The two commonest species of *Hilara* were *H. lurida* Fln. and *H. morata* Coll., for both of which there appear

to be but few British records. Another species of which several females were taken was *Tachydromia major* Zett., first recorded as British from a female taken by Mr. A. E. G. Carter by Loch Tay, and represented in the British Museum by females only from Herefordshire. Diligent search failed to produce males of this species, although males of *T. articulata* Meq. (of which no females were seen) were at first thought to be those of *T. major*, the two species being alike in thoracic chaetotaxy.—F. W. EDWARDS.

SOCIETIES.

SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.
—June 25th, 1936.—The President in the Chair.—Mr. A. Bliss exhibited *Apatura iris*, bred from a larva obtained on the Sussex border; Mr. Wallis Norton, aberrations of *Hesperia* (*Syrictus*) *malvae* and *Brenthis selene*; Mr. T. R. Eagles, larvae of *Brephos notha* and *Pygaera curtula* from Hoddesdon, Herts; Mr. C. N. Hawkins, the Coleoptera, *Clythra quadripunctata* and *Leptura cerambyciformis*; Mr. Turner exhibited *Papilio zalmoxis* from the Cameroons, of which the female remained still undiscovered, several species of the widely-distributed Noctuid genus *Cosmophila*, an intensely black species of the Danaid butterfly *Euploea martini* from New Guinea, the *Thecla coronata* from Ecuador, upon which he read notes from a letter just received, and an example of the scintillating *Morpho sulskowskyi* also from Ecuador; he also called attention to the proportion of the sexes in insects—a subject upon which very little information was forthcoming; Mr. R. A. R. Priske showed large and small examples of *Geotrupes typhaeus* and *G. spiniger* and made remarks on suggested causes of such difference in size. Short Interim Reports of Field Meetings were made by the various leaders.

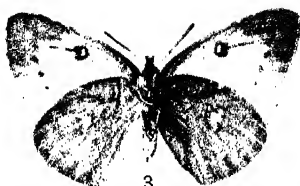
July 9th, 1936.—Mr. Jacobs exhibited leaves of poplar mined by larvae of *Phyllocristis saligna* and gave notes on the feeding habits of the species; Dr. K. G. Blair exhibited three instars of the larvae of *Papilio machaon* from Wicken, and a living Cassid beetle, *Aspidomorpha delitescens* from Nyasaland; Mr. Eagles, Coleoptera from Cutmill, Surrey, *Crioceris asparagi*, *Tomoxia biguttatus* and *Melandrya caraboides*, a series of *Scardia boleti* reared from fungus growing on oak, larvae of *Erastria venustula* from Warley Common, and larvae of *Ennomos erosaria* from Cutmill; Mr. C. N. Hawkins, *Cepphis advenaria* bred from parents resulting from New Forest ova obtained by Mr. Wakely in 1934—some were rather dark and strongly banded; Dr. Bull showed comparative series of *Agrotis ripae* from Sandwich, Norfolk, Devon and Lancashire, and the caddis-fly *Phryganea grandis*; he also reported a curious case of apparent attractiveness of a female *Cosmotriche potatoaria* shortly after death; Mr. Howarth exhibited *Macrothylacia rubi* and *Chloroclystis rectangulata*, and a life-history of *Aegeria* (*Trochilium*) *apiformis*. Dr. Bull communicated a short Report on the Oxford Congress of the S.E. Union of Scientific Societies in July.—HY. J. TURNER (*Hon. Editor of Proceedings*).



1.



2.



3.



4.



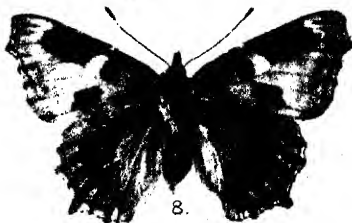
5.



6.



7.



8.

John (St. Sime & Co.) London, 1844

SOME

VARIETIES OF BRITISH LEPIDOPTERA.

For explanation see p. 221.

THE ENTOMOLOGIST.

VOL. LXIX.]

OCTOBER, 1936. 1-8-78 [No. 881]

SOME VARIETIES OF BRITISH LEPIDOPTERA.

(Plate IV.)

THE photographs reproduced on Plate IV were kindly sent in at various dates by correspondents to illustrate notes which accompanied them. These notes are reproduced below.

Figure 1: This was received from the late Dr. Gifford Nash, whose comment was "an unusual form of *Venilia maculata* taken in the New Forest last June" (i. e. June 22nd, 1933).

Figure 2: A *Lycaena phlaeas* of which G. B. Oliver writes: "One bred this autumn (1933), the only variety out of exactly 100 larvae. The light patches and streaks" on the right hind wing are the "same copper as the fore wings; one of the blue spots may be seen on the aberrant wing". $\frac{2}{3}$ natural size.

Figure 3: A bred female *Colias hyale*, of which G. B. Oliver writes: "On August 7th, 1933, 4 *C. hyale* were netted, 2 males and 2 females. Thirty-one were taken during the month, with a few others observed. Of the 31 secured 10 were females, 6 of which were kept alive for ova. The 2 females of August 7th commenced to deposit ova on the following day; hatching starting on the 16th. Six larvae fed up quickly, 2 pupated successfully, 2 made failures of the change, while the other pair were nipped by a small spider which had been introduced with the food-plant. Imagines from the successful pupae emerged on October 11th and 12th, both females, which follow the form of one of those taken on August 7th, in that the discoidal spot on the underside of the fore wing is 'open', like a roughly-shaped letter O, the centre filled with pearly-pink scales. In addition, one specimen [the one figured] is of a scarcer form, having two blackish lines running from the discoidal to the upper pair of the submarginal row of five spots, which in this specimen are more strongly pronounced than is usual."

Figure 4: Illustrates a variety of *Argynnis aglaja* which Mr. C. Granville Clutterbuck acquired in Mr. F. H. Tearle's collection. He writes of it: "The usual fulvous ground-colour is reduced to two spots on the primaries. The upper side of the secondaries has the usual dark markings but the ground-colour is fuscous, with a greenish tint. The underside is normal except that the ground-colour is darker than usual. It expands $2\frac{1}{2}$ in. I cannot find a similar variety figured in either Barrett, South or Frohawk. Mr. Tearle says that the specimen, a male, was taken by his late uncle,

the Rev. Edwin Tearle, at Laughton Wood, or as it was then called Lord Scarborough's Wood, in July, 1857. This locality, which is near Gainsborough, seems to have produced at least one other variety of this species according to a note in *The Confessions of an Entomologist*, written by his uncle and kindly lent me by Mr. Tearle. The writer says: '1857, July 24th, saw at the Rev. C. S. Bird's a splendid variety of *Aglaia* which was taken at Lord Scarborough's Wood. It is the second that has been captured in England; the first is in the cabinet of Mr. Curtis. The usual fulvous markings give place to a deep rich brown with a lovely bright border, the underside of hind wing being minus the 7 silver spots at the edge. The vicar gave 3/6 to a working man who captured it.' "

Figures 5 and 6: These figures represent the further development of the variety of *Argynnis aglaia* described by Mr. Clutterbuck. The specimen was taken by Mr. Joseph G. Fry in the Mendips during the second week of August, 1932. A description of it, by Mr. Fry, was published the same year (*Entom.*, 65: 237).

Figure 7: A brief description of this aberration of *Polygonia c-album* was included by Mr. G. B. Oliver, who bred it, in his notes on breeding this species (1935, *Entom.*, 68: 69). Of it he says: "From near the base of fore wing to within a quarter of an inch of the tip and then across the wing to the inner margin is one large patch of brownish black, with just a small dash (which does not show in the photograph) from the direction of the base to the centre, of the normal ground-colour. The dark bar then continues across the rear wing in an irregular form. Base and margins are very dark fulvous in tint." Further notes will be found on p. 282 of the same volume.

Figure 8.—An *Aglaia urticae* variety also bred by Mr. G. B. Oliver. A very similar specimen is figured by Frohawk on plate 25 (fig. 18) of his *British Butterflies*. N. D. R.

BRITISH GYNANDROMORPHOUS ARGYNNIS AGLAIA.—As a result of correspondence I find that there are two corrections that need making in the article published on this subject in the August issue *Entom.*, 69: 174-175). No. II (1) was taken by Capt. (now Colonel) P. A. Cardew, whose name was unfortunately misspelt Carden; and No. IV (1) Mr. B. W. Adkin informs me was caught, not bred, by G. Gulliver.—S. G. CASTLE RUSSELL; Crawley, near Winchester.

A SECOND BROOD OF ARGYNNIS SELENE.—On August 22nd I took a ♀ *A. selene* in Parkhurst Forest. It was quite fresh, except for a chip out of the right hind wing. On the same day a belated fresh male *Melanargia galathea* was seen.—J. F. D. FRAZER; 2, Pembroke Crescent, W. 11.

NOTE ON THE BIOLOGY OF *MYELOIS NEOPHANES*
(LEP. PYRALIDAE).

BY J. C. F. FRYER AND H. M. EDELSTEN.

IN the *Proceedings and Transactions of the South London Entomological and Natural History Society* for 1935, p. 3, it is recorded that on March 14th Mr. Wakely exhibited specimens of *M. neophanes*, one of which he had bred from a larva found by Mr. Bunnett on the fungus *Daldinia concentrica*. Subsequently, on p. 31, it is stated that Mr. Jacobs exhibited, on October 10th, the larva of *M. neophanes* feeding upon the same species of fungus collected in Broadwater Forest, but so far as we are aware no description of the larva itself has been published, and the following brief account may therefore be of interest.

On September 5th, 1935, we found larvae of *M. neophanes* in some abundance in the fungus *Daldinia concentrica* growing on burnt birches near the Little Sea on Studland Heath; previously one of us had found the larva, also in abundance, in a similar situation on the heath near the ferry to Sandbanks. Most of the larvae were full fed or nearly so, but some of them were still small and continued to feed until the middle of October. All when mature left the fungus and burrowed into cork or wood with which they had been provided, and this is evidently their habit in nature, as cocoons containing larvae were found both under the bark of the birch trees and also in the softer and more decayed wood.

The larvae remained unchanged during the autumn and winter, the first pupa being noted during March. The moths emerged over a long period—from mid-June to mid-July—and varied much both in size and the extent to which the wing markings were developed. The following is a description of a full-fed larva made by us on September 15th, 1935, and revised exactly a year later in the light of further material:

Length $\frac{3}{4}$ in. Head blackish brown, frons brown; a blackish-brown plate divided centrally by a light brown line on the first thoracic segment and a similar plate (without central line) on the anal segment; legs brown; spiracles nearly round, light brown. The general colour of the body is dark olive green or dark olive brown largely suffused with dark red brown, lighter on the ventral surface. Setal tubercles darker, but very inconspicuous except for a wart in front of the spiracle on the prothorax and more prominent black warts on the second and third thoracic segments; setae fine and whitish in colour. In shape the larva tapers towards the anal segment, is plump with the skin smooth, glabrous and somewhat crumpled or folded at the sides in the manner characteristic of many Phyticid larvae. After the larvae have ceased

feeding and made their cocoons they become greener in colour, probably owing to the loss of the colouring matter obtained from the black fungus.

Finally, it may be added that the form of *Daldinia concentrica* found growing on burnt birch or gorse appears superficially so different from that species when found on ash—its common host—that specimens were sent to Miss E. M. Wakefield, of the Royal Botanic Gardens, Kew, who has kindly replied that "according to Miller (*Trans. Brit. Myc. Soc.*, 15: 152) this fungus must be regarded as a form of *Daldinia concentrica*" in spite of its apparent difference from the typical ash form. She also mentions that the fungus from burnt birch or gorse was formerly, although probably incorrectly, assigned to the species *D. vernicosa* Schw., of which the type came from the U.S.A., and which is not believed to be European. Therefore, as bearing upon the possible distinction of the two forms of *Daldinia*, it would be interesting to know if *M. neophanes* ever attacks the typical ash form, which is not infrequently examined by coleopterists, but in which we ourselves have never found Phycitid larvae.

It may be noted in passing that in the record of *Amiota alboguttata* Wahl., bred from these same *Daldinia* (Edwards, *Entom.*, 69: 218) the name of the fungus has been incorrectly printed as *Dalidia*.

HERSE CONVULVULI (LINN.) AT 10,000 FT.—When staying at Obergurgl, in the Oetz Valley, on August 17th last, a man brought to me a specimen of this species that he had found when ski-ing that morning on the Great Gurgl Glacier at 10,890 ft. He had found it at 6 a.m. reposing in a hole in the snow some 3 in. deep, apparently made by the heat from its body; it was freezing at the time that it was found and it was already dead, although it had not become stiff when it was given to me in the evening. Subsequently I found another specimen of this species in Obergurgl at 6400 ft.—(Capt.) W. B. L. MANLEY; Field House, Minstead, Lyndhurst, Hants.

ENARGIA ULICIS (LEP. NOCTUIDAE) AT BROCKENHURST.—Included with numerous other Noctuidae taken at sugar at Brockenhurst on August 16th, 1935, was a specimen which I took for an aberration of *Leucania turca*, as it closely resembled this insect. Mr. Tams, however, determined it as *Enargia ulicis*, and said it might have come over by ship, or, alternatively, been blown over. If a friend of mine had not inquired about it, I should still have labelled it as *L. turca*. Mr. Tams had the moth for two or three days, also a list of a few of the others taken the same night. He tells me that it is a native of North Africa.—DENYS A. TIDMAN; 97, Hamlet Gardens, W. 6.

MIGRATION RECORDS, 1936.

BY CAPT. T. DANNREUTHER, R.N.

As forecast in the *Entomologist*, 69 : 185, we are now experiencing a "Silver Y year", and the records detailed below will be found to include reliable observations believed to be unique in the records of migration, namely, of swarms of the same species, *Plusia gamma*, crossing the English Channel in opposite directions on successive nights in fine weather at points about 200 miles apart, flying north into Hastings and south-by-west from the Start and Gloucestershire. See (33) and (39) below.

(1) *Records of Insect Movement.*

(23) June 14th. *Plusia gamma* : At Hindon, near Salisbury, when disturbed in a grass field 21 in poor condition, all headed north in short flights about 8 a.m. (C. M. R. Pitman).

(24) June 23rd and 26th. *Colias croceus* : Two seen flying fast to N.E. at Wareham (Dorset) on 23rd, and 3 flying east at Salisbury on 26th. All males in poor condition (J. C. B. and C. M. R. P.).

(25) June 28th. *Colias hyale* : At Compton Bishop (Somerset) a pair in good condition flying west separately with wind (Dr. C. L. Walton).

(26) July 2nd. *Pieris brassicae* : At West Tytherley (Hants) 10 flying N.E. at 20 ft. (E. J. Stone).

(27) July 4th and 5th : *Colias croceus* : At Vernet les Bains, Pyrénées Orientales. A migration to north during two days observed in which local bred specimens did not join (René Oberthür, Hon. F.R.E.S.).

(28) July 15th. *Macroglossum stellatarum* : At Harrow, 3 males and 1 female seen hovering over dahlias for a time, flew off to N.W. in a fresh S.W. wind (J. Shuttleworth).

(29) August 7th. *Pieris brassicae*, etc. : On the Lizard coast (Cornwall) watching from 4 to 6 p.m., hundreds were seen coming in from sea from the south and S.E. as far as could be seen with field-glasses. They flew at about six miles an hour up to 10 ft. Counts of five minutes in a field a little inland over a 10-yard front gave 19 and 7; and, amongst about 150 seen closely or caught, none were males. The flock flew along the cliffs, rising up certain gullies, and with them, about 4.30 p.m., 2 female *P. napi* and 1 *Colias croceus* flying N.W. were noticed, also 1 (unidentified) large dragonfly (B. A. Cooper).

(30) August 7th to 25th. *Danaus plexippus*: At Sowley, east of Lymington and 7 miles S.E. of Burley, New Forest, at 7 p.m. on the 7th, after identification on bramble, a specimen flew west (P. E. E. Harding). On 22nd one was seen at Burley and on 25th 1 at West Meon, inland of Portsmouth and 30 miles east of Burley, possibly the same (*The Field*). On August 11th, at 6.30 p.m., a good specimen appeared coming in from sea in a westerly breeze at the Start Lighthouse, Devon. When capture was attempted it flew rapidly N.N.W., rising to 300 ft., after first having been seen seaward at 150 ft. about to mount the cliff (A. W. Godfrey).

(31) August 16th. *Pieris brassicae*: From a boat in the mouth of The Wash, 6 seen flying N.W. towards land at Gibraltar Point in a light southerly wind and hot sun (C. F. Tebbutt). Next day, 17th, in a boat 2½ miles off Mablethorpe, many passed flying west towards the shore; 3 ditto on August 29th. There were 300 at Mablethorpe flower-beds between August 22nd and September 5th (W. R. Withers).

(31A) August 22nd and 23rd, at Mablethorpe (Lincs). *Plusia gamma*: Seen coming in from sea, flying west against a light wind in groups of 3 or 4 (F. T. Baker).

(32) August 22nd. *Pieris rapae*: At Eastbourne, at 3.15 p.m., over a hundred arrived, flying N.E. lazily over the cliff and spread over village gardens. Wind N.E., light and sunny (E. C. Arnold).

(33) August 22nd. *Plusia gamma*: At Hastings on the parade west of Hastings Pier, in the covered alley-way, with a continuous line of lighted electric panels for a quarter of a mile, where moths had been increasing nightly from a sudden rise to a thousand on August 20th, a watch was kept and the Curator of Hastings Museum actually saw waves of about a hundred a minute coming in from the south up the beach to the first line of lights in the alley and over it, but the moths did not go more than a few yards further inland. The immigration was watched from 8.30 to 10 p.m. By day the lights were deserted and the moths were found feeding ravenously at flowers in Warrior Square Gardens, extending 300 yards inland, and at knapweed on the hills near the coast-line. Specimens examined were found to have undeveloped ovaries. No other species were noted in the swarm (J. Manwaring Baines, B.Sc., F.Z.S.).

(34) August 24th. *Plusia gamma*: At Charlton Kings, Cheltenham (Glos), 10 to a dozen always present, flying definitely south in N.W. wind (F. B. Welch).

(35) August 24th to 29th. *Plusia gamma*: At Exmouth (Devon) over a hundred appeared at flowers each evening, and all those disturbed flew southward towards the sea. Only 3 left on August 31st (H. Henstock).

(36) August 24th. *Plusia gamma*: At Harrow a dozen flew S.W. against a light wind at 8.30 p.m. (J. Shuttleworth).

(37) August 22nd to 24th. *Colias croceus*: Four males were seen flying S.E. in Ashburton district, Devon (S. T. Stidston).

(38) August 23rd. *Vanessa cardui* and *Colias croceus*: At the Start Lighthouse at 11.30 a.m. 5 *V. cardui* and 2 male *C. croceus* were observed coming in from sea and flying N.N.W. in fine sunny weather; temperature 65° F. A captured *C. croceus* looked quite fresh (A. W. Godfrey).

(39) August 23rd. *Plusia gamma*: At the Start Lighthouse between 9.50 and 11.15 p.m. in calm weather and a clear sky hundreds, in a thin stream, passed rapidly out to sea, heading south-by-west (towards Finistère), mostly about 50 ft. above the lantern, which is itself 200 ft. above sea-level. A dozen captured on the lantern were of both sexes, looking fresh, but on examination ovaries were found undeveloped. This emigration was not so great in numbers as that experienced by the same observer on August 4th, 1935, or the first recorded on September 12th, 1934, but the moths were flying higher (A. W. Godfrey).

(40) August 30th. *Vanessa atalanta* and *Colias croceus*: At the Start Lighthouse about 10.30 a.m. 20 *V. atalanta* and 4 *C. croceus* (one a female) arrived amongst a small stationary swarm of *Plusia gamma*. They "did not stop, but flew straight off due north" (A. W. Godfrey). On the same date and time at Dungeness, 2 male *C. croceus* were seen flying S.W. (A. J. Hartham).

(41) August 30th and 31st. *Plusia gamma*: At the Start Lighthouse at 10.30 a.m., 30th, a large swarm appeared and settled thickly on every knapweed bloom or frond of bracken along the road inland for three-quarters of a mile. They appeared out of the sky overhead, but when disturbed would move 20 or 30 yards northwards, and not towards the sea. None were seen on the lantern that night and they fed at flowers all next day; but at sundown only a few hundreds were left. It was calm sunny weather; temperature 70° F. max. (A. W. Godfrey).

(42) September 1st. *Colias croceus*: At Norman's Bay, near Bexhill, 13 males and 1 female, all fresh, came in from sea and went north (H. J. Sargent). Twenty others seen next day (J. Jackson).

(2) Other Migrant Insects Present, July-August, 1936.

Vanessa cardui: At Brighton, in public gardens, 50 were seen on August 27th, which increased to over 200 next day; but on the 30th only 9 were counted, with perhaps 20 up to September 1st present. Nowhere else have so many been seen, and in many

places only single specimens or none. The range extended to the Orkneys, July 12th, and larvae were found at Barra, Outer Hebrides, which emerged August 30th (J. L. Campbell).

Vanessa atalanta: At Brighton all over the borough they were reported "in thousands from August 27th to 31st, the best year in my experience since 1891; took 40" (Major H. Blackiston). At Wannock, near Beachy Head, 50 counted at buddleias on August 24th, 20 at Southend (Essex) on August 18th, and the same at the Start on August 30th. Two dozen recorded in the Orkneys between July 15th and 23rd indicate the range. Except at the places named the species was apparently scarce, only about 100 others being recorded in July. The species become generally more abundant later, in August and September.

Control insects: *V. urticae* was reported common in the Isle of Eigg (Inverness-shire) mid-July (C. M. J.); 32 were counted at Hastings in gardens on September 1st (T. D.). *Nymphalis io* is abundant in places. Several were seen in Scotland during the last week of August, including Crinan (Argyll), where it first appeared in 1935. In the Irish lake district 60 were seen together at same period (*Morning Post*, September 4th). At Wannock (Sussex) 40 were counted together on August 24th (H. G. Macleod).

Colias croceus: Less than 100 recorded, and all in the south or Wales. About 3 dozen seen at Folkestone mid-August (E. C. Joy), and at Bexhill 20 were seen on September 2nd, a small proportion being females (J. Jackson). See (42) above for their arrival from sea at Bexhill.

Colias hyale: Four recorded in the west country at the end of June (C. L. Walton) and one fresh specimen at Folkestone August 30th (E. C. Joy); a few others in early September.

Macroglossum stellatarum: Hundreds recorded at St. Leonards together in a garden at dusk (J. R. Le B. Tomlin, *Entom.* 69: 208) on June 24th. Next day 5 seen at Salisbury (C. M. R. Pitman). Four at Harrow on July 15th and a dozen single scattered specimens elsewhere. Two at Bamburgh, Northumberland, on July 14th, gives the range.

Phsia gamma: From Kent to Cornwall the species was normally common from mid-June to mid-August. From July 9th to 12th and again on August 1st there were none at all registered by Mr. H. G. Macleod in the quarter-mile covered parade at Hastings, containing 206 6-ft. electric lighted bays in a line, which would be the first encountered by insects coming in from sea up the beach. On no occasion did the nightly count of this species much exceed one hundred (often only half a dozen) until August 20th, when the number present before midnight, estimating at 5 per light-bay, was increased to over 1000. There was then nightly increasing

abundance to a maximum, from August 24th to 26th, estimated at 4000 at lights in the covered parade, and in the fields and gardens hundreds were counted feeding ravenously in the sun daily. On August 27th the numbers at lights halved. On September 1st 534 were counted at flowers by day and 1000 estimated at lights late at night. The next night 20 remained and on the 3rd only half a dozen, with 28 dead counted in the underground garage close by.

At Brighton, where only one specimen was recorded on August 22nd, from the 25th to 27th they were "in countless profusion" and swarming on the Downs. Incomplete records now in hand already show that many myriads appeared at this period all along the coast from Essex to West Sussex, *e. g.* Thorpe Bay (Essex), "perfect plague" (A. F. Common), "thousands" on Romney Marsh, August 23rd (N. F. Ticehurst), also at Eastbourne (F. G. Bing) and Fifeild (Oxon); 24th to 26th, "12 to the square yard on Downs" at Deal (H. C. Gunton); Weston-super-Mare, 25th to September 1st, "tens of thousands, many hawked by birds—all gone September 1st" (A. L. C. E.); "Skegness gardens alive with them, 38 on 3 square yards of flower-bed", and Lincolnshire coast, Skegness to Theddlethorpe, hundreds, August 25th to September 5th, (F. T. Baker); and the species at this period was "very common" at Bexhill, Worthing, the Start, Exmouth, Harpenden (Herts), East Horsley (Surrey), Langness Peninsula (Isle of Man) (3 dozen only), Reading (Berks), Cannock Chase (Staffs), Folkestone, Petersfield, Pulborough and Selsey (W. Sussex). Smaller numbers were also recorded at Alnmouth (Northumberland), Wordwell (Suffolk), London, Bradford, and a single specimen at Barra, Outer Hebrides, on August 27th ("abundant" later). No records for Dorset and Hants available, but there was an absence of migrants noted in Isle of Wight up to August 26th (G. E. Arnold). Nowhere was egg-laying reported, though in Lincolnshire sugar beet crops were damaged by the larvae.

Nomophila noctuella Schiff: Three specimens only. Truro, July 5th, very worn, "undoubtedly breeds here" (C. Nicholson); Cark in Cartmel (Lancs), August 26th, one fresh (A. E. Wright).

Plutella maculipennis Curt.: At Wye, Kent, July 22nd, "scores to hundreds, some fresh, present in a cabbage field" (B. D. Moreton).

Pieris napi: In the Isle of Eigg, 7 miles from the Inverness west coast, for three days in mid-July, "a perfect snowstorm of them flying about a field of oats by the sea" (Miss C. M. Jannings).

Triphaena pronuba L.: On July 26th at Sumburgh Head Lighthouse, the south extreme of the Shetland Isles in lat. 60° N., an ovipositing female was captured in a west wind, force 4, and sent to the British Museum (W. H. T. T.).

(3) *Scarce Vagrant Records.*

Celerio livornica Esp.: At Brighton, on July 25th, a female was captured at rest in good condition. It died on August 8th without laying ova (Major H. Blackiston).

Plusia ni Hüb.: One taken at Swanage about August 25th (C. de Worms).

Argynnis lathonia L.: On August 22nd, 1935, near Elham, Canterbury, a specimen, with wing-tips slightly rubbed, was taken by a boy on catmint in a garden. The specimen was identified by the Curator of Folkestone Museum in August, 1936 (Cadet D. O. Dykes).

"Windycroft," Hastings;
September 8th, 1936.

NYMPHALIS POLYCHLOROS IN NORFOLK.—On August 12th, 1936, I saw a specimen of *Nymphalis polychloros* near Beeston Bog, Sheringham, Norfolk. It settled on a gate-post in the sun and permitted a close inspection.—C. L. COLLENETTE; 107, Church Road, Richmond.

A RARE GALL IN KENT.—In the middle of May I found, in a Kentish wood, the rare gall *Eriophyes dispar* Nal. Mr. Niblett kindly identified it for me and subsequently it proved to be quite common in the locality.—G. V. BULL; Sandhurst, Kent.

HYLOPHILA BICOLORANA IN WORCESTERSHIRE.—I found this species at light on August 2nd, and I have no previous record of its occurrence in this locality. I imagine that the specimen, though quite fresh, had drifted from Wyre Forest (oak), the nearest point of which is barely a mile from my light.—E. P. WHITCOMBE; Bewdley, Worcestershire.

DANAUS PLEXIPPUS IN S. DEVON.—A *Danaus plexippus* was captured at S. Huish, a small village about two miles from Bolt Tail, on October 4th last year, while sunning itself on a wall in the village. I was out sugaring in S. Huish last night and Col. Halahan passed me in the road and remarked that he had caught a very unusual butterfly last year and no one could tell him what it was, so I went into his house with him and verified it as *Danaus plexippus*. The insect was in perfect condition. Col. Halahan has given me the insect.—J. O. N. WOOD (Captain R.N., retired); 87, Palace Road, Tulse Hill, S.W. 2.

ASTEROPE BOISDUVALI WALLGN. AT SEA.—Whilst travelling back from Lorenzo Marques to Beira by sea, three butterflies, *Asterope boisduvali* Wallgn., appeared on board one night between 6 o'clock and 9 p.m., when we were about 4 miles off the Portuguese East African coast. They were flying round or settled near the electric light on deck. I don't think I saw more than 5 or 6 all told. No migration had been observed during the daytime.—(Major) J. E. DRYSDALE; P.O. Umtali, Southern Rhodesia; July 8th, 1936.

NOTES ON THE DISTRIBUTION OF THE EUROPEAN SPECIES OF THE GENUS *MELANARGIA* (LEP. SATYRIDAE).

BY A. M. PEAKE.

A STUDY of the distribution of *Melanargia** seems to indicate that only one species of the genus can exist permanently in any given locality. Where several species occur together, one tends to become predominant and to choke out the others. Why this occurs is not apparent, but it seems extremely unlikely that it is due to competition for food, since, as far as I know at present, larvae of *Melanargia* will eat any grasses available.

When this displacement occurs, the displaced species disappear from the region or become very local. Over certain restricted areas, where probably the conditions favour them, they may hold their own and become the dominating species for those particular areas.

In this connection a survey of the general distribution of the eight species of *Melanargia* found in Europe is very significant. Of these only one, *M. galathea*, is at all widely distributed; *M. japygia* appears to be confined to the Central Mediterranean region and is very local in its occurrence; *M. lachesis* and *M. syllius* occur in Spain and southern France only; *M. larissa* is not found west of the Balkan Peninsula. The remaining three are each confined to a very small area: *M. pherusa* is found only in a few localities in Sicily; *M. arge* occurs only in a few places in southern Italy; the range of *M. ines* is restricted to southern and eastern Spain. In the restricted areas where they are found each of these species is generally abundant, and no other species of *Melanargia* is common as a general rule.

RELATIONSHIP OF *M. GALATHEA* TO *M. JAPYGIA* AND OF *M. LACHESIS* TO *M. SYLLIUS*.

The personal observations I have made on the regional distribution of *M. galathea* and *M. japygia* in Sicily and of *M. lachesis* and *M. syllius* in Cataluña furnish, I think, substantial evidence in support of the theory I have put forward.

Taking first the case of *M. galathea* and *M. japygia*, occasional observations were made around Messina between 1901 and 1904, and I noted that in the Cataratte Valley and the slopes above it a marbled white occurred which was not *galathea*, and *galathea* was not to be found there. I did not know *japygia* at the time, but there is little doubt that the species observed could not have been anything else. From 1909 till the autumn of 1919 systematic

* The correct name of this genus is *Agapetes*.—ED.

notes were made on the distribution of the butterflies in Sicily, and special observations were made from 1912 to 1919 on the occurrence of *M. japygia* on the Cataratte slopes and on Monte Cici. In 1912 *galathea* was fairly common in the first-named locality, and *japygia* was still fairly abundant. From 1912 onwards a more or less progressive diminution in the number of *japygia* found took place, and in 1919 none were observed in this locality, although a few had been seen in June, 1918. By this time *M. galathea* had become extremely common. Diminution in the numbers of *M. japygia* was not due to captures, as only a few were taken from the locality in 1912 and 1913, and none afterwards.

On the southern slopes of Monte Cici, particularly on those above the village of S. Michele, *M. japygia* had held its own. From 1913—when the species was first observed there—up to 1919 the numbers of *M. japygia* varied according to the year, but there seemed a general tendency towards an increase rather than otherwise. It was extremely abundant both in 1918 and 1919. *M. galathea* appears to be absent from this region. In the south-eastern plain *M. galathea* seems to be very common everywhere except on the hills near Lentini, which is one of the few localities in this district where *M. japygia* is to be found in any abundance.

The observations I have been able to make personally on the distribution of the *Melanargia* in Cataluña have been more limited than those for Sicily. I have had, however, the advantage of seeing the excellent charts prepared by the Curators of the Museo de Cataluña in Barcelona showing the distribution of Lepidoptera in north-eastern Spain, and of examining the locality and date of capture of specimens in the museum. All the evidence I have collected goes to prove that, except in the southern part of the region, where *M. syllius* and *M. ines* have established flourishing colonies, *M. lachesis* is becoming the predominant species throughout Cataluña.

Prof. Cuni, in his book on the Lepidoptera of Cataluña, written about 1870, speaks of *lachesis* and *syllius* as being equally abundant around Barcelona, and mentions several localities for both species. From an examination of a map dated 1900 in the Museo de Cataluña, which gives the distribution of *Melanargia* in Cataluña, it is evident that *M. syllius* had then already disappeared from many localities where it formerly existed.

An analysis of the localities of capture of *M. syllius* and *M. lachesis*, based on the insects in the Barcelona Museum, taken between 1900 and 1921, shows that the range of the former insect appeared to be diminishing appreciably, whereas that of *lachesis* was expanding. Taking as an example the district around Castell de Fels, *syllius* would seem to have been common here in the earlier

years of the century, but there are no records of any more recent captures. I visited this district in May, 1922, and again in early June, 1932, and saw no *syllius* there, although *lachesis* was abundant on both occasions. In 1921 and 1922 I only found *syllius* at all common in the country around Barcelona in two localities—a valley near the Pie de Funicular Station, and around the Observatory on Tibidabo. These were two of the very few suitable localities around Barcelona where *M. lachesis* was not abundant. During these years I saw only one isolated specimen of *syllius*, above Las Planas, and two or three near S. Cugat. *Syllius* was abundant in these years in the Valcarca torrent, but very few *lachesis* were seen there. In June, 1932, I visited all the above localities, and saw a few worn specimens of *syllius* near the Observatory on Tibidabo, and an abundance of the insect in the Valcarca torrent. It was not seen elsewhere except at Esplugas de Francolí. In the last-named locality in June, 1932, *syllius* and *ines* were both common, but there seemed a well-defined territory held by each of the species. On the slopes between the village of Esplugas and the Macia-Poblet Road, insects were almost entirely *syllius* up to a point about 50 yards beyond the Monastery of Poblet. In this area I found only two *ines*, although, as I was looking for this species, I examined as many *Melanargia* as I conveniently could. On the other side of the Poblet Monastery all *Melanargia* were *ines*, and, except at the Monastery itself, I did not observe *syllius* on this side at all. During several days' stay in the district I saw only one *lachesis*, in the garden of the Monastery.

M. galathea and *M. japygia* seem always to have been restricted to a few localities in Cataluña, and appear now to have disappeared entirely. The 1900 map indicates a few localities for each species, but judging from an examination of the specimens in the Barcelona Museum no captures of either insect have been made recently in the sites indicated. Señor de Sagarra, in 1922, could tell me of no locality where I could find *galathea*, but suggested that *japygia* might possibly be found on the hills around Martorell. I have never met either insect anywhere in Cataluña.

As far as my observation goes, this—what one may call anti-symbiotic behaviour—seems limited among the butterflies to the genus *Melanargia*, and possibly also to the genus *Erebia*. The abundance of one particular species of *Erebia* in a locality, coupled with the non-occurrence or extreme scarcity of any other species, has been observed on several occasions, and a study of the local distribution of *E. manto* and *E. pronoe* in the Arlberg district seems to point to a territorial division of the two species in the region. I have, however, quite insufficient evidence to draw any conclusions for the present.

Nearly related species of the other groups of Satyridae appear gregarious, and in all of the other families of butterflies there appears to be a tendency for species of the same group to congregate together. If a species is scarce in any region it will most likely be found in a locality where the commoner species of its group are most abundant.

Gregariousness is particularly noticeable with the genera *Satyrus*, *Argynnis* and *Melitaea*; but cases of it can be found among the Lycaenids, Pierids and Skippers.

SUMMARY OF NOTES ON THE DISTRIBUTION OF THE EUROPEAN SPECIES OF MELANARGIA.

(1) *M. galathea*.

galathea is abundant locally in Sicily, particularly in the south-eastern region, *e. g.* at Siracusa and Megaera Iblea, and on the hills around Messina. Randazzo is the only locality on Mt. Etna where I have met it, and it is scarce in or absent from the Madonie and the mountains in the west of the island. It seems to occur in all suitable localities throughout Central Europe up to about 4000 ft., but apparently has disappeared from Cataluña and possibly altogether from Spain. It is scarce if it occurs at all in the Eastern Pyrenees. Time of appearance in Central Europe and around Messina is about the middle of June, but in southern Sicily insects have been seen as early as the middle of May, and the end of June or early in July would generally be the time of emergence in English localities. It is noteworthy that the Messina insects, which are very constant in their time of appearance, are as late in emerging as those found in Alpine and North French localities (Fontainebleau).

Specimens of *galathea* from all localities show considerable minor variations, and all intermediate forms between the type and the "*procida*" form occur. The so-called Sicilian variety "*siracusana*" is indistinguishable from "*procida*". The "*procida*" form is predominant in Sicily, around Digne and in most Austrian localities, *e. g.* at Althoven and around Villach.

The typical form only was found at Foix (the one locality near the Pyrenees where I have met *galathea*), at Bois le Roi and Fontainebleau, and in English localities.

In most Italian localities, *e. g.* Pracchia in the Tuscan Apennines, Brunate, etc., both forms with many intermediate insects occur—darkish insects being in a majority.

In most localities in Central France, *e. g.* Cahors, Monestier de Clermont, etc., most insects are of the typical form, although both *procida* and intermediate forms are to be found. Around Brigue all insects I have seen are of a distinct type resembling *M. japygia*.

somewhat. I believe, however, that they are "*galathea*" and not a variety of *japygia*, on account of their sluggish habits. The flight of *galathea* is relatively slow and is seldom long-sustained, whereas that of *japygia* is rapid and maintained for relatively long periods.

The form *leucomelas* is only an aberration and may occur anywhere, although it appears uncommon among insects of the *procida* type.

(2) *M. lachesis*.

lachesis is abundant in Northern Cataluña and apparently throughout the Pyrenean region, both on the Spanish and French sides. As far as I know it is not to be found anywhere outside Spain and southern France.

Its range extends to considerable altitudes. Specimens were taken on the Col de Nuria and above the Col de Puy Mourin at approximately 8000 ft. above sea-level. This is considerably higher than I have found any other species of *Melanargia*. The range of any of the other species of the genus does not seem to extend above about 5000 ft., and even at medium altitudes they are scarcer than at lower levels.

lachesis appears about the beginning of June, and the insect has a long season lasting till the middle of August, and sometimes even till the end of the month. The earliest date I have recorded is May 28th—several insects seen at Castell de Fels.

South of this locality it is less abundant. Only a few have ever been seen in the Valcarca torrent or at Esplugas de Francoli. The range of *lachesis*, however, appears to have extended considerably during recent years.

Except for occasional variation in size and rarely occurring aberrations of a minor nature all the *lachesis* I have seen are remarkably constant. *lachesis* is a more active insect than *galathea*, but its flight is not rapid, nor is it as a general rule long sustained.

(3) *M. pherusa*.

pherusa is local, but generally abundant where found in Sicily, and apparently does not occur outside the island.

It is common on Monte Cuccio, near Palermo, on the Madonie hills above Termini Imerese and on the slopes above the Alcantara River, opposite Randazzo. According to the season it emerges towards the end of April or in the first fortnight in May, and insects can be found until early in June. It is a somewhat lazy insect, and on dull days can easily be picked off the grass-stems on which it is fond of settling. The aberration "*plesaura*" may occur

anywhere with the type, but otherwise the insect shows little variation of any sort.

(4) *M. arge*.

This appears to be very local in Calabria and central Italy. In the former region it can be found, although rarely, on the hills behind Villa San Giovanni; it is more abundant around Nicotera and Cittanuova. In the foreign collection of J. Platt Barrett in the Horniman Museum there is a series of *arge* marked "Central Italy". I believe that these come from the hills around Rocca Secca between Rome and Naples. Lang, in his book on European butterflies, mentions Sicily and Spain as countries where *arge* occurs, but neither Mr. Barrett nor I ever found it in Sicily, and I know of no record of its having been seen in the island. According to Señor Sagarra, of the Museo de Cataluña, it does not occur anywhere in Spain, and he had never seen the insect till he received a series from central Italy. These are the only *arge* in the museum. Some specimens of *ines* are so lightly marked that without careful examination they might easily be mistaken for *arge*, and I think it probable that the reputed occurrence of *arge* in Spain is due to some confusion of this nature. I took one specimen of *inez* myself at Esplugas that I thought at first was *arge*, but I am now convinced that it is only an aberration of *ines*.

According to the season *arge* appears in the last half of May or early in June, and has a relatively short season. It is more active than *pherusa* or *galathea*. As far as I know, insects are very constant both in markings and size.

(5) *M. ines*.

ines is very local in southern Spain, and its range does not extend north or east of Tarragona. I found it abundant at Esplugas de Francoli in June, 1932, and, according to Señor de Sagarra this is one of the best localities in Spain. It emerges about the end of April and may last till the middle of June, or even in some seasons up to the end of the month.

It has a rapid flight, although this is not, as a general rule, long sustained.

ines appears to be a somewhat variable insect; aberrations in which the black markings on the upper wings are much reduced are not infrequent.

(6) *M. syllius*.

This species is abundant locally in Cataluña, but its range appears to be decreasing. To-day, in the immediate neighbourhood

of Barcelona, the only locality where one could rely on finding *syllius* would be around the Observatory of Tibidabo. It appears to be more abundant in the south of the provinces, as both in 1922 and in 1932 I found it common in the Valcarca Valley, and in the latter year at Esplugas de Francoli also. Lang gives South France and Piedmont as localities, but I have never met it in any of the places in these regions that I have visited. I would expect, however, to find isolated colonies in south-west France, but I believe that the winter in Piedmont would be too severe to allow it to survive, except perhaps in some very sheltered spots. In Cataluña the time of emergence appears to be somewhat erratic, as, according to the season, this may vary from early in May, to early in June. As a general rule also the period during which it can be seen is very short. In 1922 a few *syllius* were seen early in May, and the species seemed to be fully emerged by the 15th of the month. Only one worn specimen was seen that year after the end of May. In 1932 at Esplugas de Francoli quite fresh specimens were found early in June, and few of the insects seen were worn. The same thing was noticed in the Valcarca Valley, visited some days later. Around the Observatory on Tibidabo, to which a visit was made the day following, most of the few insects seen were worn. *syllius* has a rapid flight, and this is often long sustained. It is fond of warm, sunny slopes, favouring those facing south, and in contradistinction to the other species of *melanargia* it is an early riser, as I have often seen it flying about 9 in the morning. It is seldom to be seen on the wing after 3 in the afternoon. The other species of the genus all seem to prefer the afternoon sunlight.

A certain amount of minor variation occurs in this species, but as a general rule there is little divergence from the type.

(7) *M. japygia*.

This is found locally throughout Sicily and Calabria, and is sometimes abundant, although its range seems to be diminishing. Around Messina it used to be common on the slopes above the Cataratte torrent, but had become scarce there by 1919. It was still common at that time near the top of the San Michele mule-path. It appears to be distributed in the form of colonies in restricted areas throughout the south-eastern plain and low hills. I have met it myself in some abundance near Lentini, and have seen specimens taken in other localities between Catania and Siracuse. I found it on one occasion near Randazzo, and this is the only locality on Mt. Etna that I know of. It occurs also in Calabria in localized colonies, but I have no record left of any specific localities—as far as my memory serves, it can be found on Monte Sant Elia between Palmi and Bagnara. I have never taken

japygia elsewhere, but saw some insects near Digne in June, 1927, that, from their appearance and extremely rapid flight, were almost certainly of this species. Around Messina the time of emergence is very constant and is always early in June, but in the south-east the insect appears about the middle of May. In all localities insects are on the wing for two to three weeks only. The only occasion I found *japygia* at Randazzo was July 2nd.

The flight of *japygia* is very rapid and long sustained, and it has a predilection for flying up and down very steep slopes. It is the most difficult to capture of any of the marbled whites.

japygia is a fairly constant species, although at times aberrations occur showing a decrease of black markings.

EARLY DATES FOR SCOLIOPTERYX LIBATRIX.—With reference to the note (p. 199) by Mr. Busbridge, I took two freshly-emerged specimens of *S. libatrix* at sugar at Niton, I.W., on July 11th, 1930, and another on the next night.—T. BAINBRIDGE FLETCHER; Rodborough, Glos, September 14th, 1936.

LIMENITIS CAMILLA.—Being favourably situated here for observation, I have been interested to ascertain the wastage of the larvae of this insect prior to hibernation. On August 11th I made a casual search for larvae along the outskirts of a cant of chestnut underwood adjoining some young trees cut and open to the western sun. I located in all some 24 larvae feeding on the honeysuckle and about a score of ova. The forwardest larvae were about four days old. On August 24th I went over the same ground again. I found 42 "spiked" leaves upon which larvae had fed recently. On 36 of these the larvae were still feeding, on the remaining 6 they were missing. Many of these larvae had passed the second moult, but there was a fair proportion in the second coat and a few which had not yet moulted at all. On September 2nd I made a more exhaustive search over the same ground, as I anticipated that ~~many larvae~~ would now have entered into hibernation. In this surmise I was mistaken. I found only 3 larvae had retired, but far the greater number were out on the leaf preparing this for the hibernaculum. I found in all 98 leaves upon which larvae had fed this summer. On 70 of these the larvae were still intact, on the remaining 28 they were missing. This gives a wastage of 26·5% between August 11th and September 2nd, which, taking into consideration the weather conditions, seemed to be somewhat high. Between August 11th and September 3rd we experienced here a total drought of 22 days, during which period bright sunshine was considerably above normal and conditions distinctly favourable. About a score of these larvae were very backward and had yet to moult the second time, so that it is not unlikely when the roll is finally called that the missing will be little short of 30%.—STANLEY MORRIS; Ranscombe, Fox Hill, Sturry, Canterbury; September 9th, 1936.

A NEW SPECIES OF *EARIAS* Hb. (LEP. NOCTUIDAE).

BY E. P. WILTSHIRE.

Earias irakana Wilts. sp. nov.

♀. Palpus and antenna pink; fore leg and mid-leg, tibia and tarsi rose-tinged; head and prothorax yellowish green; thorax green, like fore wing; abdomen with short, silky, white hairs. *Fore wing* shaped as in *chlorana* L., but rather smaller; green, as in *chlorana*; costa narrowly white; *underside* uniformly whitish green, with the fringes rather more vivid. *Hind wing*, as in *chlorana* and *syriacana*, whitish with a terminal green infusion towards the apex.

♂. Like ♀. Wing expanse 18 mm.

Holotype.—♀, bred from a larva found at Bagdad, which hatched April 29th, 1936. In British Museum.

Allotype.—♂, bred from a pupa found at Bagdad, which hatched May 11th, 1936. In my own collection.

Paratype.—♀, similarly bred, hatched May 10th, 1936. In my collection.

E. chlorana L. differs from *E. irakana* in having a slightly greater size, a white head and prothorax, an extension of the white costal colouring over the dorsum of the fore wing, fore-wing underside with a bright subterminal green infusion near the apex, and whitish palpus.

E. syriacana Staud. differs from it in having a slightly greater size, fore wing white-powdered, and nervures indicated.

E. chlorophyllana Staud. differs in having a narrower fore wing, more rounded at the apex, a hind wing less rounded at the apex, a yellowish-white suffusion on the fore-wing dorsum, an orange-red fore-wing fringe and a reddish hind-wing termen.

Of the last I have only seen one example in order to make this comparison, and that is in the British Museum and comes from Mardin. My examples of *syriacana* were taken by myself in the Lebanon. The *chlorana* examples with which comparison was made were English and German.

In addition to the typical material listed above, I also have examples taken at light at Mosul and Rayat (altitude 4000 ft.), Kurdistan, where it occurs among willows at the headwaters of the Rowanduz Chai, one of the tributaries of the Greater Zab, which flows into the Tigris. It will probably be found all up and down the Tigris and Euphrates, and far into Kurdistan, but it is curious that the South Russian *chlorophyllana* should be recorded from Mardin and elsewhere in Kurdistan. *chlorophyllana* occurs also at Enzeli on the Caspian south shore; since Rayat is on the Persian frontier of Irak, *irakana* might turn up in Persia, around

Tabriz. The dividing line between these two species' ranges must run a curious course.

At Bagdad I have found the larva and pupa on the Euphrates poplar, but its presence at Mosul and Rayat shows that it must also feed on Willow.

The larva is less than $\frac{1}{2}$ in. long, is pale grey inclining to ochreous above and greenish below, with darker grey mottlings above the spiracles, leaving a pale dorsal area on the abdominal somites, which narrows on somites 5 and 8, and finally again on somite 11. Head, glossy black on top, grey in front. Somites 2 and 3, each with a pair of black subdorsal points. Spiracles black. A few pale hairs, longest fore and aft. The boat-shaped cocoon is white and silky when spun up on a leaf, but when on the bark of the tree harmonizes in colour with it. The pupal period is about nine days—at least this is so in April and May.

NOTES AND OBSERVATIONS.

TOBAGO AND ITS BUTTERFLIES.—In the article which appeared in the last issue of this magazine (*Entom.*, 69 : 200–208) on this subject, several misprints unfortunately occur which need correction. On p. 201 the number of species is incorrectly given (line 18) as 102, whereas it is actually 101, as stated later in the article. On the same page (line 29) the reference to the *Trans. Ent. Soc. London* should be completed by the addition of the date 1908. On the next page two mistakes occur in lines 16 and 17 ; it is the coast path or track (not tract) leading to Agenza (not Ageuza) Bay to which it was intended to refer. And on p. 203, line 9 from the bottom, the name of the well-known Trinidad naturalist, Mr. P. L. Guppy, has been unfortunately misspelt Guptry.—W. G. SHELDON.

NEPHOPTERYX SIMILELLA ZINCK.—A male of this species was taken at light in Mid-Sussex on June 18th, 1936.—H. M. EDELSTEN ; Bramble Hill, Balcombe, Sussex.

[Published records refer to captures of this species only in the New Forest, *c. g.* Barrett, *E.M.M.*, 1903, 39 : 1, and Hayward, *Entom.*, 1928, 61 : 282.—ED.]

FOOD-PLANT OF TYRIA JACOBÆAE.—With reference to the two recent notes on the food-plant of this species (*Entom.*, 68 : 188 ; *ibid.*, 69 : 217), I have for the past ten years always found larvae of *T. jacobæae* in this neighbourhood feeding on groundsel (*Senecio vulgaris*). This may be because in this urban district ragwort (*Senecio jacobæae*) is scarce and local, whereas groundsel is a common weed in gardens and allotments. I have noticed, however, that even where ragwort does occur commonly, on waste land, the smaller species is always the food-plant. I have found none of the difficulty in the changing

of ragwort-feeding larvae over to a diet of groundsel, and *vice versa*, of which Mr. Buckstone complains. During 1933, near Leatherhead, Surrey, I noticed several large colonies of larvae of *T. jacobaeae*, which, having finished off their ragwort supply, had moved on to ox-eye daisy (*Chrysanthemum leucanthemum*) plants nearby, and were steadily denuding these. I also found a couple of larvae on yarrow (*Achillea millefolium*).—B. A. COOPER; 61, Okehampton Road, N.W. 10, September 9th, 1936.

MIGRANT *PLUSIA GAMMA* AT NEARLY 10,000 FT. CAUGHT IN A STORM ?—While crossing the Boekkar Glacier in the Gross Glockner group, Austria, on August 9th last, I observed a number of specimens of the moth *Plusia gamma* lying stiff on the snow and apparently dead, as none of those collected subsequently showed any signs of life. In all some 20 specimens were seen in a space of a few yards. The time was 7 a.m. on a brilliant morning, the height approximately 3000 metres. The day before had been stormy, and snow had fallen until about 10 p.m.; since the moths were lying on this fall the flight over the glacier must have taken place after 10 p.m., and, if one may judge from the complete rigidity of the insects, considerably before 7 a.m. on the following morning. *Plusia gamma* was common, though not specially abundant, in the neighbouring valleys up to a height of about 1600 metres; but one did not see anything of it by day above that altitude. On the same day two specimens of *Aglais urticae* were seen flying about the snow-covered top of the Klockerin (3422 metres); this is the highest I have myself seen that insect.—R. F. BRETHERTON; Merifield, Dean Court Road, Cumnor Hill, Oxford, August 23rd, 1936.

PLUSIA GAMMA IN QUANTITY.—The summer of 1936 occurred in two periods in this locality—June 18th to June 27th, and August 17th to 25th. Any other dates were simply—NOT summer! The moment summer arrived on June 18th butterflies and moths appeared, and the valerian in the garden had its usual visitors, *Metopsilus porcellus*, *Chaerocampa elphenor* and *Plusia gamma* being unusually common. There is no reason to suppose that the latter were migrants. They did not appear to be coming or going in any definite direction. Like the Hawk-moths, they began to appear at the valerian at dusk, and as the few hot days went on they became more and more plentiful, until at last, on June 27th, I counted 20 specimens at one large clump of Valerian. Then the numbers died away gradually, as did those of the Hawk-moths, and when the usual rain and cold returned with July there were no butterflies or moths left anywhere. But the second spell of summer produced another swarm of *P. gamma*. These were probably the descendants of the June brood, and had bred in the garden and neighbourhood. *Porcellus* breeds in the garden itself. This second *gamma* brood was even more numerous than the first, literally swarming everywhere. As they flit about so quickly it is most difficult to count them, but on this occasion they were most plentiful at buddleias, and I counted

again up to 20 at one bush. Here again they showed no signs of being migrants, but just an ordinary emergence, gradually increasing in numbers and then diminishing after a fortnight, though there are still one or two about, September 8th.—B. TULLOCH (Brig.-Gen.); Hill Court, Abergavenny, September 8th, 1936.

DOES GRAPHIPHORA PLECTA MIGRATE?—On the evening of August 6th last, while collecting between Penzance and Falmouth, Cornwall, I took 40 specimens at sugar, together with 10 by dusking, of *G. plecta*. During the three previous evenings only 4 specimens were caught, while on the six nights before this none appeared at all. The evening of the sixth was warm and cloudy, with practically no wind, but the day, though sunny at first, had been cool and dull, with fair wind. The full moon was obscured till late, but previous evenings had been very bright. Some nights were misty or wet, but warm. Many specimens were in perfect condition, but quite a number were very much on the worn side. The sudden increase in numbers was hardly attributable to weather conditions, sudden emergence or absence of moon, since it was not accompanied by similar happenings among other species. Immigration would therefore appear to be the only satisfactory explanation. Is there any previous evidence to show that this species is migratory?—B. A. COOPER; 61, Okehampton Road, N.W. 10, August 23rd, 1936.

LIPOPTYCHA TORRANA PIERCE.—This presumed species was included in *The Genitalia of the British Tortricidae*, p. 97, pl. xxxiv. Subsequent examination of further material proved that the specimens used in describing this as a new species consisted of males of *L. plumbana* and females of *L. aeralana*, which were taken flying together; therefore this name falls and the paragraph describing it as a species on p. 97 should be deleted.—F. N. PIERCE; The Old Rectory, Warrington, Peterboro.

EUCOSMA BRUNNICHANA L.: A CORRECTION.—In the last issue, in two places (*Entom.*, 69: 203, line 18, and 217, line 36) this name was unfortunately misprinted as *brunnichiana*. The blame attaches regrettably to the Editor, who was on holiday.—ED.

PAIRING OF VOLUCELLA BOMBYLANS.—In the *Entomologist*, October, 1926, Dr. F. W. Edwards asked for information regarding the pairing of *Volucella bombylans* L. On June 21st, 1936, at Wither Slack at 3.30 p.m., a fine sunny day, I found two pairs *in cop*. All the four insects were var. *plumata*. I have only once before seen this species paired, and this was recorded in *Entomologist*, November, 1926, the male being var. *plumata* and the female *bombylans*.—ALBERT E. WRIGHT; Brunleigh, Grange-over-Sands, September 2nd, 1936.

PROBABLE OCCURRENCE IN ENGLAND OF THE SO-CALLED TYPICAL RACE OF ANOPHELES MACULIPENNIS Mg.—Of the five or more varieties or races of the malarial mosquito *Anopheles maculipennis* now recognized in Europe, only two have hitherto been identified

with certainty as occurring in England—var. *atroparvus* van Thiel and var. *messeae* Falleroni. Both these varieties show a feature which is generally regarded as distinctive of *A. maculipennis*, in contrast with the closely-allied *A. elutus* Edw.—the presence of a yellowish area in the fringe at the extreme tip of the wing. Recently Mr. T. Bainbrigg-Fletcher submitted to me a series of *A. maculipennis* taken near Stroud, Glos, in the summer and autumn of 1935. Some of these were taken in a house and show the usual pale fringe-spot; others were taken out of doors at sugar used as bait for moths, and all these latter have the wing-fringe entirely dark (though in other respects they resemble *A. maculipennis* and not *A. elutus*). Perhaps the dark wing-tip may prove to be a feature of the "typical" *maculipennis*, though hitherto the only observed distinctions between these and var. *messeae* are found in the eggs. Typical *maculipennis* is considered to be a non-domestic species characteristic of hilly districts, and its occurrence in the Cotswolds would not be unexpected. The point can be settled if eggs can be obtained from gravid females.—F. W. EDWARDS.

INVERTED MALE HYPOPYGIA IN ERIOPTERINE CRANE-FLIES.—Many years ago (*Ann. Trop. Med.*, 14: 24, 1920) I called attention to the fact that in the Tipulid genera *Molophilus* and *Rhypholophus*, as in all mosquitoes, the hypopygium in the fully developed male occupies an inverted position, the anal parts being ventral and the genital parts dorsal; the rotation takes place shortly after emergence from the pupa, and when once it has taken place the organs remain in their new position and are not freely rotatable as in *Sciara* and many other Mycetophilidae. A recent re-study of the genera of Eriopterini shows that the phenomenon of inversion is of somewhat wider occurrence in the tribe than I thought at first. Thus it occurs in all species (so far as I have seen) of *Molophilus*, *Dasymolophilus*, *Tasiocera*, *Ormosia* (including *Rhypholophus*), *Ilisia*, *Empeda*, *Cheilo-trichia* and *Styringomyia*. On the other hand the normal, non-inverted hypopygium is found in all species of *Erioptera* s. str. *Gonempeda* (*flava* Schum.), *Psiloconopa*, *Symplecta* and *Trimiera*. The condition of the hypopygium therefore seems to provide a useful secondary criterion for separating certain closely-allied genera or subgenera.—F. W. EDWARDS.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.—July 23rd, 1936.—Mr. E. E. Syms, F.R.E.S., Vice-President, in the Chair.—Dr. Blair exhibited living larvae of *Dipterygia scabruscula* from Hendon; Mr. Bunnnett, photographs showing the life-history of the beetle *Crioceris asparagi*; Mr. T. R. Eagles, a bred series of *Eupithecia dodoneata* from Bookham larvae, and cocoons of the Neuropteran *Conwentzia psociformis*; Mr. Wallis-Norton, larvae of *Euchloris*

smaragdaria; Mr. Moore, a Mayfly he had kept alive for 13 days. Mr. C. N. Hawkins, for Mr. Wakely, exhibited two nearly full-fed larvae of *Erastria venustula*, and read notes on the feeding habits and notes on the occurrence of the larvae of *Mimas tiliae* on birch. Dr. Cockayne showed the very local Hemipteron *Cicadetta montana* from near Chiddingfold; Mr. Attwood, cocoons of a *Cionus* beetle on figwort, which resembled the seed-pods, and egg-clusters of the *Attelabus nitens* on leaves of Spanish chestnut; Mr. Hy. J. Turner, a short series of *Doritis apollinus* and read notes on its various forms, and examples of *Colias ladakensis* taken at 13,000 ft. elevation in the Himalayan Mts.; Mr. Jacobs, cocoons of *Yponomeuta vigintipunctata*, and pointed out that the skin of the larva was outside the cocoon; Mr. Wiltshire, various species of Heterocera, including a new species of *Amathes*; and Mr. Coote, larva, ova and a female of *Lymantria monacha*. Mr. Attwood gave a preliminary report of the Benfleet Field Meeting.

August 13th, 1936.—Mr. F. T. Coulson, Vice-President, in the Chair.—Mr. A. E. Tonge presented the Society with the collection of natural history lantern-slides made by the late Dr. T. A. Chapman. Mr. de Worms, Mr. Eagles and Dr. Bull exhibited living larvae of Lepidoptera; Mr. Bunnett, photos of various stages of development of the larva of *Stauropus fagi*; Dr. Bull, a fine example of the beautiful green larva of *Eumorpha elpenor*; Mr. Howard, some British Geometers, including a melanic *Thera obeliscata*; Mr. Hawkins, for Mr. Ennis, the highly-spotted form of the larva of *Amorpha populi*; Mr. Coulson, Coleoptera taken by Miss Kirby in the Shetland Islands, including *Lesteva monticolor*, *Athoris subfuscus* and *Apion ryei*. Dr. Blair exhibited specimens of the dragonfly *Agrion pulchellum* with a midge, *Pterobosca paludis*, attached to the underside of one fore wing, from Wicken (see *Proc. R. Ent. Soc.*, 1936, p. 62), also Chalcids, *Entedon euphorion*, bred from cocoons of the weevil *Cionus scrophulariae* by Mr. H. Moore. Mr. Coote, made a preliminary report of the recent field meeting at Gomshall and Hackhurst Downs.—HY. J. TURNER (*Hon. Editor of Proceedings*).

OBITUARY.

EDWIN P. SHARP.

WE regret to state that Edwin P. Sharp, F.E.S., passed peacefully away on August 14th, aged 67. He had been in indifferent health for some months, but the sad end was not expected. He was out walking as recently as last week and planning mothing expeditions with the writer for the autumn. Mr. Sharp first took up the study of entomology in 1905 and was a keen field worker, and had the good fortune to add one or two moths to the Sussex list.

He specialized in the Noctuidae, and his services to science were recognized some years ago, when the Entomological Society elected him a Fellow.—S. A. CHARTRES.

THE ENTOMOLOGIST.

VOL. LXIX.]

NOVEMBER, 1936.

[No. 882

THE LIFE-HISTORY OF *LAMPROPTERYX OTREGIATA*, METCALFE.

BY E. A. COCKAYNE, D.M., F.R.C.P.

(Plate V.)

SINCE the Rev. J. W. Metcalfe first discovered *Lampropteryx otregiata* at Ottery St. Mary in 1907 it has been found in other woods in Devon, in Cornwall, and more recently on the Continent. The late Mr. A. W. Mera bred four moths, feeding the larvae on *Galium saxatile*, but though he obtained eggs from them, the larvae refused to eat the same food-plant. He told me that the larvae were very sluggish and were brown, like those of *suffumata*, but he published no description. Metcalfe himself tried to get the larva to feed on various species of *Epilobium* and other plants, but though some of them nibbled *Galium aparine*, they all died young, and his hope of giving a description of the early stages has never been fulfilled. It is possible that woodruff, *Asperula odorata*, is the natural food, as Newman suggested in 1917, though this plant, in my experience, likes a dry chalky soil. *Galium palustre* and *A. uliginosum* are both found in the dark wet woods in Devonshire, where *otregiata* occurs, and, if they have not been tried and rejected, one of them is more likely to be the food-plant than *Asperula*.

In 1933 the Rev. J. W. Metcalfe kindly sent me 41 eggs of *otregiata* and advised me to try *Galium aparine*. Being unable to get woodruff in time to try both plants, I did so, and bred imagines without difficulty. This unexpected success, the first since Mera reared his four larvae, has enabled me to give an account of the life-history, and it seems fitting that it should appear in the journal in which the species was first differentiated from *L. suffumata*, Hb.* Although the species was named in 1917 it has attracted little attention. South still ignores its existence, and I know of no figure, unless the specimen of *suffumata*, second brood, from Wales figured by Barrett is really *otregiata*. If so, its fore wings are too pointed, the central band and apical mark are not nearly dark enough and are brown instead of black, and the hind wings are light brown instead of silvery grey.

The male genitalia of the two species are very similar, the chief difference being that the anellus lobe of *suffumata* is longer in the ratio of 30 to 18, and tapers towards the distal extremity.

* Metcalfe, J. W., 1917, *Entom.*, 50 : 72.

Arising from the extremity in *suffumata* is a long spine with a solid hair-like termination, about half the length of the hollow part. In *otregiata* no such spine arises from the lobe of the anellus, which is shorter and ends squarely. These differences are shown in the figures (5 and 6, Plate V), which are done to the same scale.

OVUM.—The ova received May 18th, 1933, were laid singly or in pairs on the leaves of *Galium aparine*. They are rather large, straw-coloured, oval and slightly wider at one end than the other. The ratio of length to width is about 10 : 7. Five days before hatching they begin to turn browner, and the day before hatching became leaden. The surface is covered with minute raised dots, forming rings (about eight dots to a ring), and each dot takes part in the formation of two or more contiguous rings. Without focusing, about thirty of these rings can be seen in a line along the long axis of the egg. In addition, the whole surface is finely pitted.

LARVA.—*First instar* : May 22nd. On first hatching the whole of the larva is pale yellowish-brown, chamois, but the dorsal surface soon becomes deep olive. The head is chamois. Setae, long and pale by reflected light, are set on large dark conical tubercles, with black apices. Anal plate and posterior half of anal prolegs blackish-grey, the plate squared posteriorly. The larva is deeply incised between the somites and wrinkled laterally. I think some white markings became visible just before ecdysis, but all the larvae changed skin before I could examine one under the microscope again. The larva uses no silk thread, and sits with the posterior end nearly at right angles to the stem and the anterior end much coiled.

Second instar : May 27th–28th. Considerably larger. Head whitish-yellow, faintly freckled with brown, mouth-parts light ochreous. Thoracic plate whitish-yellow. Dorsum above spiracles uniformly deep olive, venter, anal plate and prolegs chamois. Setae rather long, pale by reflected light, dark against a white background, each arising from a large blackish-olive tubercle with a black apex. Legs nearly colourless. Thoracic and anal plates chamois. Anal plate blunted posteriorly. Deeply incised between the somites, lateral fold conspicuous. Towards the end of the instar the deep olive dorsum becomes lighter and a definite pattern is visible. There is a pure white dorsal line on all three thoracic somites, a white spot in the centre of abdominal 2, 3 and 4 between the beta tubercles, and from this spot two white lines diverge and then curve inwards to end at the posterior margin of the first subsegment of the somite behind. External to them is a white dot on either side of the first subsegment, continued as a white line lying external to the alpha and beta tubercles and ending at the posterior margin of the somite. There is a broad white

spiracular stripe widening to reach the upper edge of the tubercle of rho and the lower edge of that of eta. This stripe is bordered below by deep olive. Ventral to nu and mu is a narrow white line, broken in the middle of the somite and just touching the upper edge of the tubercle of omega. Just ventral to tau is the still narrower subventral line, and finally the chamois ventral stripe. The edge of the anal plate is white and there is a white line running down the anterior part of the anal proleg, the posterior part being darker than the ground-colour. The spiracles are round and black, with a white centre.

Third instar : June 1st-2nd. The description of the larva in the fourth instar applies in most respects to the third. The white dorsal thoracic stripe is relatively wider, and fills the whole space between the alpha tubercles and is bordered by a very dark (snuff-brown) stripe; the white mark on the mesothorax just internal to rho is very conspicuous, but the rest of two pale lines on the dorsum is less clear than in the next instar. The white spot between the beta tubercles of each abdominal somite is very distinct, but on the first the inner pair of white lines rising from it is indistinct, and on both first and second abdominals the outer pair only appears as a white dot on each side of the first subsegment of the succeeding somite, and is continued as a white line running just outside the alpha tubercle to a point just outside beta, where it ends. On the third abdominal there are two pairs of white lines as in the next instar. On the fifth abdominal the outer white line of each side only reaches the alpha tubercle, curving round to enclose its outer half, but a white semicircle encloses the outer half of each beta tubercle. The dorsal dark band and the inverted V on each abdominal somite are snuff brown and the rest of the ground-colour of the dorsum is tawny olive.

Fourth and last instar : June 7th. Head rather longer than broad, whitish, with a grey-brown tint; on the anterior aspect of each lobe (vertex) is a broad dark brown stripe with six ill-defined horizontal lines external to it. Clypeus (front of Fracker) pure china white, basal segment of antenna china white, distal segments brown, with darker brown rings at joints, china white dot internal to the six black ocelli. Legs almost colourless, tinged with ochreous. On the thorax is a pure white stripe almost filling the space between the alpha setae, and dividing into two narrow white divergent lines on the last two subsegments of the metathorax. External to the thoracic stripe is a narrow line a little paler than the ground-colour, and lying within it towards its outer side are the gamma tubercles. External to this subdorsal line is another similar line just internal to the rho tubercle. At the rho tubercle of the mesothorax it widens and becomes pure white, forming a conspicuous marking.

External to the rho tubercle of the pro- and mesothorax is another very narrow pale line. Between the thoracic stripe and the subdorsal line the ground-colour is snuff brown and external to the subdorsal line it is tawny olive. On the first abdominal the two dorsal white lines form a **U**; the subdorsal line lies just outside the alpha and beta tubercles, and the pale line external to it lies just internal to the rho tubercle. Just behind and internal to each alpha tubercle is a large pale spot. Between the beta tubercles is a pure white spot, expanding posteriorly and giving rise to two parallel white lines, which diverge and converge again on the first subsegment of the succeeding somite to form two semicircles and continue across the second subsegment as two parallel lines. Just behind the white mark an oblique white line arises on each side, and is continued across the first two subsegments of the succeeding somite as a longitudinal one. The snuff-brown colour becomes intensified round the white spot and outside the oblique white lines, forming an inverted **V**. The second abdominal is similar, but there is a more definite snuff brown dorsal stripe, and on either side of it an oval pale area. On the third abdominal the oval patch has a longitudinal central shading. In both these somites the inverted **V** extends to the rho tubercle of the following somite. The fourth abdominal has a similar pattern, but the white markings at the posterior end are larger and more conspicuous. The ground-colour of these somites is bistre. The posterior abdominal somites are conspicuously lighter than the anterior ones. A dark brown dorsal stripe runs down all of them, and is bordered on each side by a white line, then by a stripe of ground-colour, and external to this is a broad white band freckled with brown ground-colour. The alpha and beta tubercles of the sixth and seventh lie in its centre, but it is external to those of the eighth, and passes between those of the ninth, and finally crosses the anal plate. On the sixth abdominal there is a white streak just internal to the rho tubercle, and on the seventh and eighth there is a continuous white line internal to the rho tubercles. The anal plate is cinnamon brown, with a white margin, and ends bluntly. The lightest parts of the ground-colour, those of the venter and sides, the dorsum of the sixth abdominal and the whole of the seventh, eighth, ninth and tenth are cinnamon brown or Brussels brown. The spiracles are black with a small white centre, and with the eta and kappa tubercles lie in a broad white spiracular stripe, intersected by lines of ground-colour in the creases. Below it and separated from it by a stripe of ground-colour is a much narrower broken white stripe, consisting of a dot at the anterior margin of the somite, a stripe just above tubercles nu and mu, a white oval mark reaching the posterior margin, but lying at a higher level, and a dot at a lower level at

the posterior margin. Below this is a stripe of ground-colour, tawny olive, and then a broken white line only present along the anterior and posterior quarters of the somite. And then on the venter is a white stripe enclosing tau, with a break between tau and pi, and becoming continuous from pi to the posterior margin. Next to it and still nearer the midline of the venter is a tawny olive stripe, twice the width of the narrow white subventral stripe, which comes next, and expands to enclose sigma. Finally there is a narrow mid-ventral line, snuff-brown on the anterior half of each somite, and tawny olive like the rest of the ventral ground-colour on the posterior half. This change of colour is not brought out in the figure. The outer aspect of the first proleg is dark red-brown mottled with tawny olive and the anterior aspect is white; the anal proleg is tawny olive, with a white line down it near the anterior border and a thin dark brown one near the middle.

The most important feature of the larva, which is present to some extent throughout life, is the colour of the large conical tubercles, from which the setae arise. Those on the dorsum of the thorax and first five abdominal somites and that of the supraspiracular or rho seta are deep brown with the apices almost black. The supraspiracular of the fifth is the largest and darkest, but those of the fourth and sixth are very conspicuous. The alpha tubercle of the fifth is the largest and blackest of all, the beta tubercle of the same somite coming next. The tubercles of the lateral setae are all much smaller and lighter; those of abdominals, 6, 7, 8 and 9 are also small and pale like the ground-colour.

The larva grows very rapidly and the ground-colour becomes much paler, with the markings less distinct as they approach maturity. The colour varies, some having a redder tint than others. Some are sayal brown with a snuff-brown dorsal stripe and inverted V, while others are Saccardo's umber with a sepia V. The stretching of the skin also reveals in all of them a conspicuous orange cinnamon stripe replacing the ground-colour of the second subsegment of the second, third and fourth abdominal somites extending down to the level of the spiracles. The venter is tawny olive and the darker markings bistre.

The full-grown larva is 18 mm. long. The skin is very thin and the abdominal contents show through. The figures rather over-emphasize the pattern, and since they were drawn from blown specimens the deep intersegmental divisions and big lateral folds and wrinkles are not shown.

The larva at no time uses a silk thread and its resting habit in the last instar is variable. Some rest with the back slightly arched, the feet pressed against a stem or leaf and the head laid flat, so that the mouth-parts are visible from above. Others sit

with the back slightly curved and with the posterior part of the abdomen at an angle of 45° with the stem, and with the head and legs tucked up. They fall off the food-plant very readily and coil up completely, but quickly return to a leaf. Several larvae got caught on the sharp recurved hooks of the *Galium aparine*, especially just after changing skin, and died of their injuries. Several others were found hooked and unable to release themselves, but recovered after they were set free. Apart from these accidental deaths none was lost.

On June 10th and 11th 23 larvae went down, and the remaining 6 went down on the 12th. They were placed in a box with earth at the bottom and a thick layer of damp moss above, and were left undisturbed. After emergence the pupae were found in the moss with only a few threads of silk spun round them. The first imagines, 16 in number, hatched on July 1st. It had been a very hot day, and when I got back late at night they had flown about and many were worn. Four more hatched on July 2nd, and one on each of the following three days. No more hatched before I went for my holiday at the beginning of September, but on my return at the end of the month I found that five more had emerged. One pupa is lying over until next year. Though many were spoilt, none of the imagines was crippled. The larval period was very short, only 18 days, and there were three ecdyses, one less than the usual number in the Geometridae, while the shortest pupal period was 21 days.

COMPARISON OF THE LARVAE OF OTREGIATA AND SUFFUMATA.

There are several differences between these larvae in the last instar apart from the much greater size of *suffumata*. Although the pattern of *otregiata* is very distinct just after the moult, it soon becomes fainter, and in the blown larva it almost disappears, proving that it owes much to reinforcement by the dark abdominal contents, and that the amount of pigment in the skin is relatively small. In *suffumata* the pattern remains clearly defined all through the last instar, though naturally the contrast between light and dark parts lessens, and even in the blown larva the pattern is fairly distinct, showing that the amount of pigment in the skin is much greater than in *otregiata*.

In *suffumata* the white dorsal thoracic stripe is broader and more uneven at the edges than in *otregiata*, and the two lines on each side are wider and lighter, so that the mesothoracic white mark is more conspicuous in *otregiata*. On the last subsegment of the first to the fifth abdominal somites inclusive the space enclosed by the semicircular white lines is much darkened in *suffumata* and is visible to the naked eye as a series of dark dots, whereas in

otregiata the darkening is very slight. In *suffumata*, on the dorsum of the first five abdominal somites the spaces between the four white lines arising from the white spot lying between the beta tubercles are occupied by longitudinal wavy red lines, and these are continued on to the space between the inner and outer white lines on each side of the last subsegment, and of the first subsegment of the succeeding somite. Almost all the darker parts of the dorsum of the sixth, seventh, eighth and ninth abdominal somites are formed by similar red wavy lines. There are also some red lines mixed with brown external to the white stripe, which runs outside the alpha and beta tubercles.

The red on the posterior part of these somites is well shown in Buckler's figures. In *otregiata* there is no red, but the whole of the ground-colour of the dorsum of the first subsegment of the third, fourth and fifth abdominal somites is orange cinnamon.

In *otregiata* there is a dark mark, most distinct on the fourth and fifth abdominal somites, just in front of the supraspiracular tubercle, rho, while in *suffumata* the mark extends forward to the post-spiracular, kappa, of the preceding somite, and these marks together form a broken but distinct lateral line on all the abdominal somites, a line which is a continuation of the complete lateral line on the thorax. It is present even in the pale forms of *suffumata*.

The ventral pattern differs in the two species. In *otregiata* there is a complete narrow brown ventral stripe of nearly equal width throughout, and a pure white or creamy subventral stripe of the same width on each side of it. Another white or cream stripe of the same width runs from the pi tubercle of one somite almost parallel to the subventral, but gradually approaches it and finally hooks round the tau tubercle of the succeeding somite. Just in front of the tau tubercle a white bar unites this stripe with the subventral. On the fifth and sixth abdominals it curves more evenly towards the subventral, and unites with it both before and behind the tau tubercle. In *suffumata* there is no continuous brown ventral stripe, but on each abdominal somite about the level of the subspiracular, eta, tubercle there is a dark brown triangle, base directed forwards, and on each side of it a broad white stripe mottled with light brown. On the following subsegment a broad white ventral stripe begins and has the sigma tubercle in it; the stripe gradually narrows and reaches its narrowest point at the posterior margin of the second subsegment. On each side of these markings is a broken white stripe, beginning between the pi and sigma tubercles as a narrow stripe, then widening, and narrowing again to end in a point just posterior and external to the tau tubercle, in front of which it is united to the subventral stripe by a white bar. The ventral white stripe is much mottled, with little patches of

light brown, and in some larvae these coalesce towards its central part, and form an irregular light brown ventral stripe corresponding to the lighter part of the complete ventral stripe of *otregiata*. The white markings of *suffumata* are much broken by little patches of ground-colour and by microscopic wavy brown lines, while those of *otregiata* are pure white (or cream), which gives the under-side of *otregiata* a much neater appearance.

The tubercles, however, are the best character for distinguishing the larvae. In both species each seta is set in a small ring of black chitin at the apex of a conical tubercle, and the tubercles are largest on the dorsum of the mid-abdominal somites and smaller on the sides and venter. The alpha, beta, rho and many other tubercles are almost white in *suffumata*. Those of *otregiata* are blackish brown on the dorsum of the thoracic and first five abdominal somites, and are especially large and conspicuous on the fourth and fifth abdominals, alpha, beta and rho, the trapezoida and supraspiracular being the largest and blackest.

EXPLANATION OF PLATE V.

FIG. 1.—Head, thorax, and first abdominal somite of full-grown larva of *Lampropteryx otregiata* (dorsal aspect). $\times 10$.

FIG. 2.—Remaining abdominal somites of full-grown larva of *Lampropteryx otregiata* (dorsal aspect). $\times 10$.

FIG. 3.—Third and fourth abdominal somites of full-grown larva of *Lampropteryx otregiata* (ventral aspect). $\times 10$.

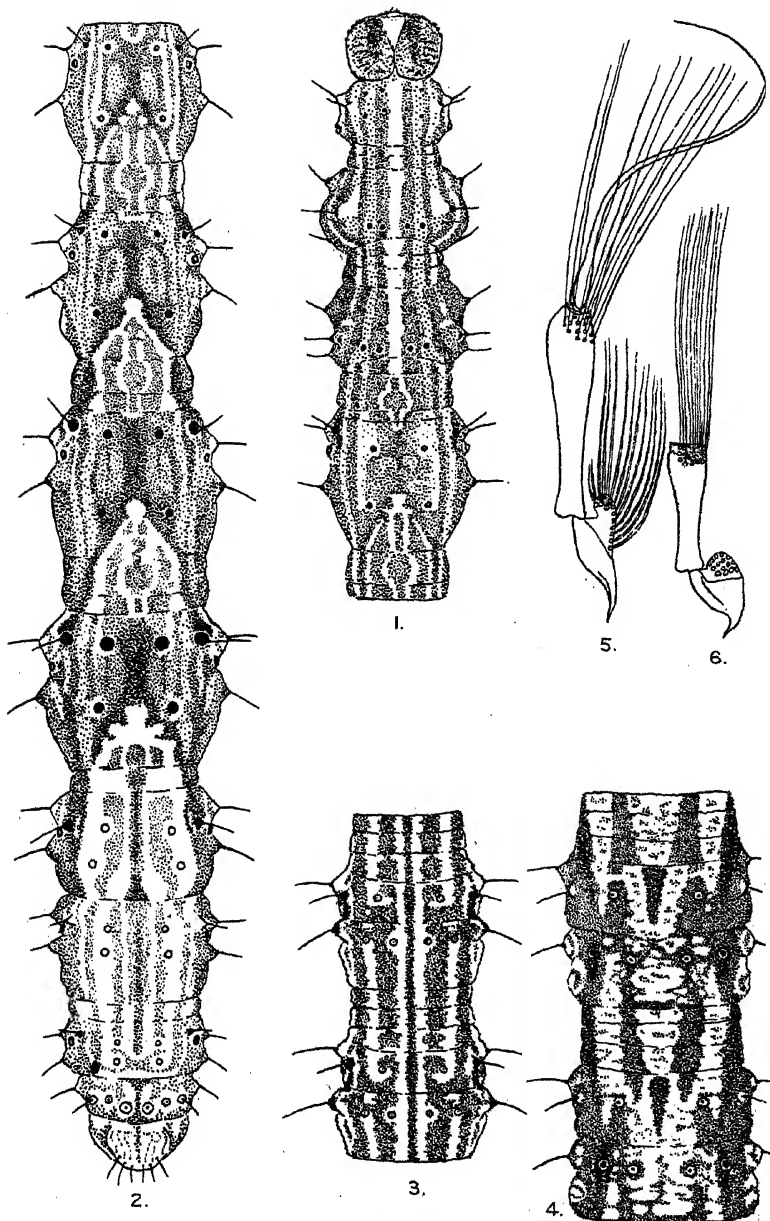
FIG. 4.—Third and fourth abdominal somites of full-grown larva of *Lampropteryx suffumata* (ventral aspect). $\times 10$.

FIG. 5.—Anellus of *Lampropteryx suffumata*, Hb.

FIG. 6.—Anellus of *Lampropteryx otregiata*, Metcalfe.

COLIAS CROCEUS AT EASTBOURNE.—During the second week of September *C. croceus* was common along the front, being attracted by the valerian in bloom. I also saw a large number of Vanessaids, chiefly *Aglais urticae*, several *Vanessa cardui* and *V. atalanta*; *Plusia gamma* swarmed.—F. W. FROHAWK; October, 1936.

POLYGONIA C-ALBUM IN N. DEVON.—Our Michaelmas Daisies are a show in themselves, but the splendid quantity of freshly-hatched *Vanessa atalanta* and *Aglais urticae*, with a few *Nymphalis io*, greatly add to their beauty. A shabby *V. cardui* was there, too, a few days ago, but to my amazement, on Sunday, October 4th, there was first one, and then, in another part of the garden, a second *c-album*—the first that I have ever seen here after a residence of over fifty years. The specimens are quite freshly hatched, dark and rather small. As a gardener I have deplored the increase in nettles, but if they bring *c-album* I shall mind less. There are no hops about here. I saw one *Colias croceus* in the garden on September 12th, but no others anywhere along the hedgerows, etc. *Plusia gamma* has been in abundance lately. No more *c-album* have been seen, but the east wind has been strong and cold.—(Miss) K. M. HINCHCLIFF; Worlington House Instow, N. Devon.

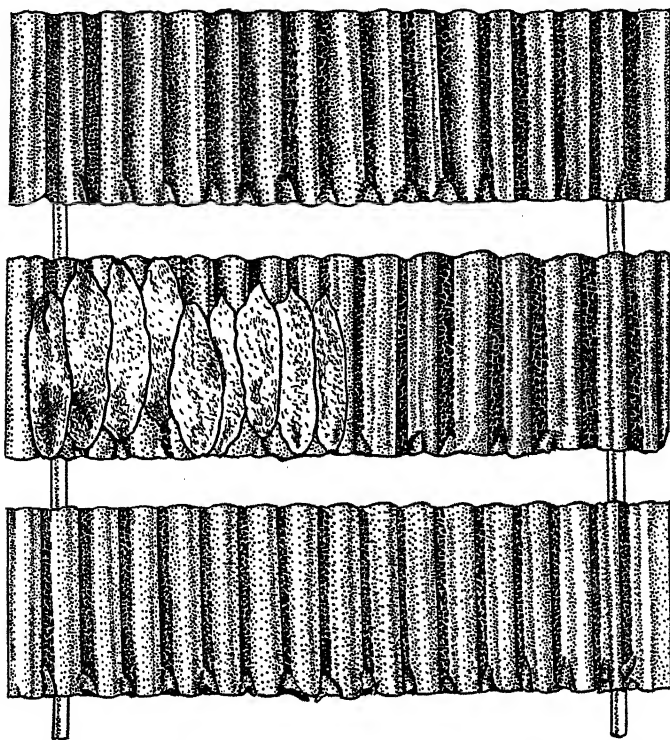


John Bale Sona & Darnley, 154 London.

AN ARRANGEMENT FOR PREVENTING LARVAE FROM SPINNING THEIR COCOONS ON TOP OF THE COCOONS OF OTHERS.

BY G. A. BRETT.

DURING breeding experiments with *Hemerophila abruptaria* (Thunb.) I have been much troubled by its habit of pupation. Just before pupation the larvae of this moth apparently become positively thigmotactic. The position they prefer is a vertical groove filled in



Cocoons of *Hemerophila abruptaria* on strips of corrugated cardboard.

at its lower end by some projection which forms a slight and generally sloping platform. It thus happens that when one larva spins its cocoon in a crevice or groove, it forms by so doing an ideal spot for another larva to pupate immediately above it. This position is nearly always occupied in preference to any other, and a long line of cocoons is thus made, in which each cocoon blocks the

(52) September 11th. From a yacht cruising near the Dyck Light Vessel, N.E. of Calais, between 1 and 2 p.m. two dozen *Vanessa atalanta*, 3 *Pieris brassicae*, 2 or 3 *Plusia gamma*, 2 *Aeshna* dragonflies and some wasps were all seen flying south against a light wind in sunshine (L. H. Mattheson).

(53) September 11th. At Potterspury, Northampton, 14 *Plusia gamma* and 1 *Vanessa atalanta* arose from clover and flew west in a light S.S.E. wind; at the same time 6 *Aglais urticae* flew south (H. M. Wellcome).

(54) September 12th. *Plusia gamma*: At Fair Isle South Lighthouse, situated between the Orkneys and Shetlands, at 11 p.m. 5 specimens and a Noctuid were captured out of about 50 seen flying to the N.E. in calm weather (temp. 55° F.) (G. E. Craigie).

(55) September 13th. *Aglais urticae*: A fisherman reported that when about 10 miles south of Exmouth at 3 p.m. a dozen passed close to him, flying south with a light wind assisting (S. D. Gibbard).

(56) September 13th. At Great Hamden, Bucks, it was noted that about two dozen *Plusia gamma* and three dozen *Aglais urticae* feeding at flowers were all moving west against a light wind (J. Shuttleworth).

(57) September 14th. *Pieris brassicae*: When passing the Casquets, a few miles off the Channel Islands, at 3.30 p.m. a specimen was seen flying very fast to the N.E. (J. R. le B. Tomlin).

(58) September 9th. *Plusia gamma*: At the Start Lighthouse between midnight and 1 a.m. in fine weather with a light N.W. wind (temp. 58° F.) a swarm of from 400 to 600 passed in a thin stream, flying south. Six specimens were captured on the lantern glass, and with them a female *Vanessa atalanta* (A. W. Godfrey).

(59) September 13th to 15th. Near the Start Lighthouse watching on the shore during the afternoons up to 6 p.m. the following migrants were counted, all flying to the S.S.W. until lost to sight at sea: September 13th, light west wind (temp. 62° F.), 40 *Vanessa atalanta*, 12 *Aglais urticae* and 35 *Colias croceus*, including 5 var. *helice* all flying about 5 ft. above the sea; on September 14th, in a stronger west wind and flying at a height of up to 100 ft., in four hours there passed 4 *V. cardui*, 14 *V. atalanta* and 37 *C. croceus*, including 7 var. *helice*; and on September 15th, flying low in a light W.S.W. wind, 15 *V. cardui* (A. W. Godfrey). At Hallsands, close by, on September 13th, 30 *C. croceus* were counted on Charlock (E. G. Corbet).

(60) September 18th. At Fair Isle South Lighthouse at 10.30 p.m., 5 moths, flying S.W., were captured and identified as *Plusia gamma* (G. E. Craigie).

(61) September 21st. *Plusia gamma* and *Vanessa atalanta*: At the Start Lighthouse in calm weather with light rain (temp. 60° F.), soon after midnight, dozens of *P. gamma* and 4 *V. atalanta* were flying south. Some rested on the lantern and were captured, including 2 *V. atalanta*, which were sent in for examination (A. W. Godfrey).

(62) September 28th. *Vanessa atalanta*: At Rodborough (Glos), a male and a female were marked on capture in the garden, and on release immediately flew high up to the S.W. in a moderate N.N.E. wind (T. B. Fletcher).

(63) September 1st to 8th. *Plusia gamma*: At Round Island, Scillies, hundreds appeared and, after feeding, went north (R. Trotter).

(2) *Other Migrants Present, August–September, 1936.*

Vanessa cardui: After August 15th 50 appeared at Hastings, and on August 28th over 200 at Brighton. In September the species was scarce generally, but 21 were counted between Deal and Dover on September 7th. In the north only single specimens were reported, and even in the south some observers reported absence this season—Okehampton, Ashburton, Gerrard's Cross (Irish and Scottish records not in hand).

Vanessa atalanta: Excluding Scotland and Ireland the September records account for about a thousand. The emergence in the south took place about August 25th; at this period the species was very common in Yorkshire, common at Blackpool, and increasing in numbers in the south, but nearly all gone by October 5th, when weather turned cold and wet.

Control insects: An hour's count made in Stanley Park, Blackpool, where insects congregated on beds of single dahlias, showing a preference for the yellow "J. H. Jones" variety, at 3 p.m., September 13th, was as follows:—*Nymphalis io*, nil, compared with 120 *Aglais urticae*, and with them were counted the following migrant species: 1 *Vanessa cardui* (male), 20 *V. atalanta*, about 300 *Plusia gamma*, but less than a dozen *Pierids*. Except in Ireland *N. io* was below average and generally absent as usual in the north; on the other hand, *A. urticae* was more abundant than last year in many places.

Colias croceus: The summer brood was apparently commonest in S. Devonshire. Mr. W. Blatch reported "several hundred" at Exmouth (see *Birmingham Post*, October 1st). Apart from this, only about 300 others are accounted for, including 4 at Barra in Outer Hebrides on September 28th. Mr. A. F. Common found none in Essex this year where he captured many dozens last year. See Section (1) above for emigration.

Colias hyale: Less than a dozen seen. Four males taken in first half of September at Bexley and Folkestone, Kent.

Herse convolvuli: Four captures only reported: September 14th at Bourton-on-the-Water, Glos (C. Donovan); September 15th, Stokenham, Devon (A. W. Godfrey); September 27th, Felpham, Sussex (L. Buttress); September 29th, Harwich (H. E. Chipperfield).

Macroglossum stellatarum: Scarcer than usual. Six recorded between August 28th and September 17th at Uig, Skye (P. A. Buxton); 2 at Long Ashton, Som. (A. H. Wilkins); Liverpool (Mrs. Vlasto); and 2 at Weymouth (W. R. Thompson).

Plusia gamma: The Advisory Entomologist for the province reports in the area about 40 miles around Newark: "Very large population of *P. gamma*. In the first week of August the larvae began to attack sugar beet crops in Lincolnshire and Leicestershire. By mid-August 90% of the leaves were holed. Emergence took place between September 14th and 20th. Nottinghamshire, Rutland and South Derbyshire were also affected, but larvae less abundant" (A. Roebuck).

Recent records add to the areas already reported as invaded, e. g. at Weston-super-Mare,* August 25th, "scores of thousands" (M. J. L. Davis); on Cleeve Hill above Cheltenham "myriads on *Scabiosa arvensis* August 26th" (C. Donovan); in Lundy Island swarms, estimated at 12,000, congregating on heather, seen on August 29th, diminishing September 1st and few left September 3rd (S. P. Rawlins); at Hailsham, Sussex, evening September 12th about 1500 seen on *Scabiosa columbaria* (S. Salvage). Other places where the species was "very common" at end of August were Sheppey Island, Pevensy, Weymouth, Chagford, Bristol, Abergavenny and Aberfeldy; they were then "common" in Isle of Wight, Axbridge, Mablethorpe and parts of Hants and Cornwall. In September they continued "very common" in the Lincs province, Bucks, Devon to Scilly Isles, and in Sussex between Rye and Eastbourne from September 11th to 27th, after which very few were left; also at Brighton, where none were seen on September 13th, there were hundreds from the 16th to 23rd, but no damage to crops is reported in the south. The species was also common at Barra, Outer Hebrides, Fair Isle and Scarborough in September. On September 27th a swarm suddenly appeared at Timoleague, S. Ireland.

Nomophila noctuella: Four or five seen at Dungeness on September 9th (G. V. Bull). No others reported.

Hapalia ferrugalis: Abundant at Timoleague, co. Cork, in September (Mrs. G. E. Lucas).

* On p. 229 *ante* for "Weston-super-Mare" read "Bristol".

(3) *Scarce Vagrant Records.*

Danaus plexippus: In addition to the August records (see p. 226 ante) one was captured in a garden at Salcombe, Devon, at 2 p.m. on September 16th, and on release flew east (Mrs. Besant, J.P., *W. M. News*, September 22nd). About September 19th one was seen flying due north at West Meon, Hants, and another report comes from Cornwall with no details.

Nymphalis antiopa: Two doubtful records. August 27th, one accurately described as seen by a policeman; September 22nd, one sighted in flight by H. G. Macleod, both at Hastings.

Celerio euphorbiae: A specimen was successfully reared at Hastings from a larva taken in the Channel Isles last year (H. G. Macleod).

Leucania vitellina, Hb.: At Dungeness a male was taken at sugar on September 8th, and a female on September 13th, both in fair condition (B. Embry).

(4) *Other Records of Insects at Sea, 1936.*

Mr. K. Clarke, cruising from Lisbon to the Straits of Gibraltar, on the afternoon of August 12th saw 4 *Vanessa atalanta* flying to the N.E., one of which was captured and found slightly worn. In the Straits at 6 a.m. next day a *Macroglossum stellatarum* flew round the vessel and then went north; at 10 p.m. 2 others flew on board and were captured at lights (females).

Mr. F. England, serving in the Haisboro' Light Vessel, situated 9 miles N.E. of Mundesley, Norfolk, sent reports and specimens to the British Museum of the following:

July 18th. A dragonfly, *Aeshna grandis*, flying N.E. in a strong S.W. wind and heavy rain was captured on board at 2.30 p.m.

July 25th. One out of two *Arctia caja* going west was captured at 5.30 a.m. in a light N.E. wind.

August 8th. During the day dozens of *Plusia gamma* in several flights of 8 to 16 were observed, all going to the N.W. against a light N.N.W. wind. With three captures was a Noctuid (? *Apamea secalis*).

August 20th. At 3 p.m. 7 *Pieris rapae* passed, going east with the wind, of which 1 was captured.

August 26th. A butterfly, believed to be *Nymphalis antiopa*, was seen coming from the west, but not captured. One *Aglais urticae* was taken.

September 8th to 12th. Several moths were seen dead in the sea, but not identified.

Note.—Other records from the Norfolk Light Vessels not yet available.

"Windycroft," Hastings;
October 10th, 1936.

NOTES ON MR. A. M. PEAKE'S PAPER ON THE DISTRIBUTION OF THE EUROPEAN SPECIES OF THE GENUS *MELANARGIA*.*

BY W. G. SHELDON.

MR. PEAKE'S statement, *ante*, p. 231, that "a study of the distribution of *Melanargia* seems to indicate that only one species of the genus can exist permanently in any given locality" is interesting, it is startling, but I doubt if it is in accordance with such evidence as is available on the subject.

Mr. Peake says, "Why this occurs is not apparent, but it seems extremely unlikely that it is due to competition for food, since, as far as I know at present, larvae of *Melanargia* will eat any grasses available". I entirely agree, but apart from the food question it is difficult to find any other that would assist Mr. Peake's theory; the only possible one seems to be war, which incidentally is usually produced by competition for food. Butterflies are not given to war-like tendencies or practices; the nearest approach is two or more of them toying or dancing in the air, but does not this usually mean love rather than war?

On the other hand, one sees in the Alps and elsewhere large assemblages of several species peacefully sipping moisture, or sitting lazily, half a dozen of them, on a thistle or other attractive flower.

There are certain points mentioned by Mr. Peake that seem to require comment. On p. 231 he states, "*M. iapygia* appears to be confined to the Central Mediterranean region". I don't know whether he would include Central Spain and Portugal in this area, but it is a common and widely distributed butterfly there, in the form *cleante*, Boisdu. Apart from these regions *M. iapygia* is found thousands of miles away from the Mediterranean. Seitz's report of its distribution (1908, *Macrolepidoptera* 1: 115), is "the species with its local forms is distributed over an enormous area, which extends from Portugal to the Pamir and Altai"? These two latter regions are not, of course, in Europe, but it occurs, in the form *subarvius*, Hbst., near Budapest, and in 1914 I found it abundantly near Sarepta on the Volga; both of these localities are, of course, in Europe, but not in the Mediterranean region.

Mr. Peake says, *l.c.*, p. 235, "the form *leucomelas* is only an aberration (of *galathea*) and may occur anywhere, although it appears uncommon among insects of the *proclita* type".

I am not aware that there exists, or ever has existed, a single specimen of *leucomelas* from any British locality. Seitz says of *leucomelas*, *l.c.*, p. 115, "such specimens with uniformly white

* As stated in the foot-note to p. 231, the correct name of this genus is *Agapetes* Billb.—[Ed.].

undersides to the hind wing occur amongst the name typical form, as well as among *procida* and *turcica*".

I have encountered form *leucomelas* only once, at Digne in the south of France, in July, 1904, but it was certainly not uncommon, and by devoting a morning to the *galathea* flying along the hillsides at least half a dozen *leucomelas* could have been secured. Note, the form of *galathea* occurring at Digne is *procida*!

With regard to Mr. Peake's statement quoted at the head of these notes, it is not correct to say that only one species of *Melanargia* occurs permanently on the same ground. In July, 1905, I was staying at La Granja and Albarracin in Central Spain; an account of my visit will be found in *Ent. Record*, 1915, 18:57-60, 95-100. On p. 58 I say, "Over the grassy places *Melanargia iapygia* var. *cleante* and *M. lachesis* were abundant", and on the same page, "great creamy *Melanargias*, *M. var. cleante* and *M. lachesis*, with its local and striking ab. *cataleuca*, were settled five or six on a thistle"; the above refers to two localities at La Granja. On p. 97 I say, "At Puerta de La Losilla *Melanargia iapygia* var. *cleante* and *M. lachesis* were in plenty"; this was at Albarracin. At La Granja, too, *M. sillius* occurred, but as its emergence is during May and early June the specimens were very wasted, but not uncommon; obviously they would have been more numerous earlier in the season.

I am without records available showing how long the *Melanargias* existed at La Granja, but as regards Albarracin there is conclusive evidence.

The first lepidopterist who investigated its fauna was Canon Bernardo Zapater, who resided there for many years. Maximiliano Korb, a well-known German entomologist, collected Lepidoptera at Albarracin in 1881 and 1882. The results of their work are to be found in the excellent *Catálogo de los Lepidópteros de la Provincia de Teruel*, jointly edited, and dated 1883. In this catalogue they state, p. 28, "*M. lachesis* very frequent in June and July". Ten localities are given, including Puerta de La Losilla. "*M. iapygia* var. *clotho* (Hb.)* rather abundant at the Puerta de La Losilla and in other parts of the Sierra."

Of a third species, *M. ines*, the catalogue says, "rather frequent in June and July at Albarracin and in other parts of the Sierra".

In May and June, 1913, I again visited Albarracin, with the late A. H. Jones. An account of our visit is to be found in *Entomologist*, 1913, 46. On p. 330 it is stated that "*Melanargia lachesis* was common in some meadows at Santa Croche (near Albarracin) at the end of June" (by Jones). I left Albarracin on June 23rd; my friend

* This is an error: *clotho* Hb. = *suwarovius* Hbst.; it should, of course, be *cleante*, Boisd.

stayed on until the 30th. Jones also took a few specimens of *cleante* at La Losilla on June 23rd and 25th. *M. ines* was first taken on June 13th, and at the end of the month (after my departure) it became frequent.

It will thus be seen that we have a definite record of two species of *Melanargia* occurring, not only in the Albarracin district, but in a particular spot, La Losilla, before 1883 and in 1905. One of them was found there in 1913, and no doubt the other would have been, a little later in the year. I should say that La Losilla is considerably higher, and therefore later than Santa Croche, where Jones took *M. lachesis*.

It is, of course, a well-known fact that many Lepidoptera, as well as other organisms, are for a number of years abundant for some unknown reason, and then they almost or quite disappear for long periods of time. It is not necessary to go further than our British fauna to illustrate this. Take *Polygonia c-album*, for instance. In the middle of last century it was a widely spread butterfly. Newman, *British Butterflies*, pp. 50-51, 1870, gives it as occurring in thirty counties; he also says of it, "a species of very capricious habits in regard to geographical range in this country, in some localities being a constant resident, in others appearing and disappearing at intervals". In 1881 that excellent lepidopterist, G. Coverdale, wrote in *Ent.* 14, p. 210, "*V. c-album* is undoubtedly becoming scarce in Great Britain, and is perhaps on the road to extinction." As every British lepidopterist knows, *c-album* was confined to what is its centre of distribution, the west of England and some Welsh counties, from about the time Newman wrote until a few years ago, when it suddenly spread over the greater part of the south of England, and is now a common butterfly in our gardens in Surrey, Kent, and other home counties, in fact, even extending to the outer suburbs of London.

Limenitis camilla (sibylla) is another butterfly that, after being extinct or not seen in many of its old localities for a quarter of a century or more, has suddenly extended its range and repopulated its old habitats, again almost to the suburbs of London.

I take it this periodic abundance and scarcity, which applies to many organisms, apart from Lepidoptera, is the reason why *Melanargias* are not found in localities where they were formerly abundant. One should bear in mind, too, that in Italy, and even more so in Spain, to which countries Mr. Peake's notes particularly refer, the butterfly fauna has only been investigated in very few regions, and often in a very casual manner.

ERYNNIS TAGES : PROBABLE SECOND EMERGENCE.—On August 18th last, at Dorking, Surrey, I captured a freshly emerged individual of this species.—A. A. W. BUCKSTONE; 90, Pams Way, Ewell, Surrey.

NOTES AND OBSERVATIONS.

VANESSIDS IN SOUTH IRELAND.—Major H. Chavasse, writing from co. Cork on September 26th, states: "Of course there are always a lot of *Aglais urticae*, but there was a perfect riot of *Nymphalis io* followed by a wave of *Vanessa atalanta*. I have only seen three specimens of *V. cardui*, but I never knew fewer *Pieris brassicae* than I have seen this year." Later he wrote that quite a number of *cardui* had been seen, and two *Colias croceus*. In N.E. Surrey *N. io* has been very scarce, and both *V. cardui* and *V. atalanta*, also *P. c-album*, have been much scarcer than usual. Both *P. brassicae* and *P. rapae* have been abundant during August onwards. *Plusia gamma* has appeared in abundance.—F. W. FROHAWK, October, 1936.

"MARKING" VANESSA ATALANTA.—I have recently started marking *Vanessa atalanta* in this neighbourhood, with a view to ascertaining whether any of them hibernate here, and also in the hope that some of them may be captured in other localities and recorded, so giving some idea as to how they migrate. I should much appreciate the hospitality of your columns in order to give the experiment as much publicity as possible. The mark is a spot of green cellulose paint on the underside of each of the hind wings in the region of the discal cell, and a further spot on the upper side of each of the fore wings, on the costal margin near the base. On some of the early marked specimens there is no spot on the upperside, and one or two have it on the thorax instead. I hope that anyone who sees or captures any of these specimens either this year or next spring will be kind enough to let me have the data.—G. A. BRETT; The Wellcome Entomological Field Laboratories, Claremont, Esher, Surrey, September 21st, 1936.

LIMENITIS CAMILLA IN LINCOLNSHIRE.—On August 2nd of this year I saw a *Limenitis camilla* fluttering above the tarred surface of a road in the outskirts of Stamford. I have heard of no other specimens occurring locally.—E. M. BOLTON KING; Watford, Emlyn Street, Stamford, Lincs.

AGLAIS URTICAE: A CORRECTION.—The *A. urticae* aberration illustrated in the October *Entomologist* is incorrectly described as being bred. This is a wild specimen, taken July 13th, 1925, and was jointly recorded with others on p. 195 of vol. lix.—G. B. OLIVER.

DISTRIBUTION OF THE GENUS MELANARGIA (LEP. SATYRIDAE).—With reference to (6) of the Summary of Notes on the Distribution of the European Species of *Melanargia* (*Entom.*, 69: 231, *et seq.*), I have found *Melanargia syllius* abundant and widely distributed, as I feel sure many others have, in April in Le Var, and in May in Vaucluse. I cannot remember ever having seen *M. galathea* flying with it.—G. K. GREGSON (Col.); Lye Green House, Withyham, Sussex, October 13th, 1936.

* See foot-note on p. 260.

DISTRIBUTION OF THE GENUS *MELANARGIA*.*—I was much interested in the article by Mr. A. M. Peake in the October number of the *Entomologist*. My own observations on the distribution of this genus, however, do not seem to bear out his conclusions as to the predominance of one species at any given locality, as the following notes from my personal records will show :

(1) *M. ines* and *M. syllius* were flying together commonly near the town of Murcia in S.E. Spain in the latter half of April, 1927.

(2) *M. ines* and *M. lachesis* were flying together in the Sierra de Alfacar, near Granada, in mid-June, 1927.

(3) *M. syllius* and *M. japygia cleanthe* were flying in equal abundance in flowery meadows near S. Rafaele, Sierra de Guadarrama, on June 20th, 1929.

(4) *M. lachesis*, *M. ines* and *M. syllius* were flying together in the Sierra de Espuña, in the province of Murcia, at 4000 ft. in early June, 1927.

(5) *M. lachesis* and *M. syllius* were both flying on the Sierra Nevada on June 20th, 1927.

(6) *M. galatea procida* and *M. syllius* were both abundant at Ste Maxime on the French Riviera in 1925, the former from the first week in June, the latter during the last half of May.

As regards the distribution of *M. japygia cleanthe*, I may add that it was flying in abundance on the Montagne de Lure, not far from Digne, on July 24th, 1928, and that General van Straubenzee reports it as having been common there this year. In August, 1930, I took a series of very pale *M. galatea* on the Puy de Dôme in central France. The black markings were very inconspicuous, and from the general appearance of the insect I thought at first that I was taking *M. lachesis*. There is no doubt, however, that it is a very pale form of *M. galatea*.

As regards *Erebia manto* and *E. pronœ* in the Arlberg district, I found both these species flying together near the top of the Arlberg Pass on August 10th this year. I have taken 29 separate species of European *Erebias*, and have visited a good many mountain districts in search of them, but I have never, with the exception of *E. zapateri*, found any species occupying an area to the exclusion of others, though of course any given species is only found on the kind of ground and at the altitude that suit it. It has been my almost invariable experience that any species of *Erebia* will be either absent from a locality, or, if present, common there.—B. H. COOKE (Brigadier-General); Inniscrone, Datchet.

THE DELTOID, *HYPENA OBSITALIS*, HUB., IN IRELAND.—On October 8th I received a small tin of moths from my sister, Mrs. G. E. Lucas, and enclosed in the package was her note to me, dated October 6th, in which she says : "We took 9 *P. fluvialata*, 7 ♀ and 2 ♂, last night [October 5th, 1936]. I send these on to-day, along with what we have determined as *Hypena obsitalis*, taken the same time at ivy in the yard. Is this rare moth supposed to be an immigrant?"

* See foot-note on p. 260.

The place referred to is the yard of Ummera House, near Timoleague, co. Cork. I examined the moth on the date of its receipt; it was unset, and I was very much puzzled over its identity. At first I took it to be a very richly coloured *Hypena rostralis*, but the fore wings were too broad and pointed for that species. Then on a second consideration and after studying the literature on the Deltoids I came to the conclusion that my sister was correct in her identification, and that the insect was not of the type pattern and coloration as usually understood, but the var *a* of South as described by him in the *Entomologist*, 1890, p. 270. To establish conclusively the identity of the specimen, I sent the moth on the 8th inst. to the British Museum (Natural History), South Kensington, and yesterday received Mr. Tams's decision. I quote from his letter, dated 9th inst.: "The Deltoid you have so kindly presented to us is the variety, or very near it, of *H. obsitalis*, described by South in 1890 as var. *a*."

The previous records for this very rare visitor to our shores are: (1) One at Bloxworth, Dorset, by the Rev. O. P. Cambridge, on September 21st, 1884. Recorded by him in the *Entomologist*, 1884, p. 265, as—"On the 21st September last I captured a moth unknown to me, at rest on a door-jamb in my flower-garden. It was evidently a *Hypena*, but quite distinct from either of our known British species. My old friend, Mr. F. Bond, has kindly compared it with specimens in the British Museum Collections, and determined it to be *Hypena obsitalis*, Hüb., not before recorded as British". This note is dated November 10th, 1884. There are remarks by the then Editor, J. T. Carrington, and a woodcut of the species. (2) "A good specimen of *Hypena obsitalis* was taken at ivy in Paignton on October 5th, 1908, by Mr. E. J. Milman. I had neither figure nor description of *obsitalis* at the time, and though I showed it to many visitors, the specimen was not identified for several years. It agrees with South's var. *a* and Tutt's var. *costipuncta* (Tutt's *British Noctuae and their Varieties*, vol. 4, p. 67), and has a wing expanse of 36 mm." (P. P. Milman, *Entomologist*, 1917, p. 44.) (3) One seen, but not taken, in osier beds near the Frome at Iford, Dorset, on July 11th, 1917, by Dr. F. H. Haines (*Entom.*, 1917, p. 256).

The Irish specimen does not tally with Hübner's types, figs. 164 and 165 (*Sammlung europ. Schmett.*), but answers to Tutt's ab. *costipuncta* (*Noctuae*, 4 : 67), corresponding to var. *a* of South above referred to. It was interesting to find the Deltoid associated with the assumed migratory Geometer, *Phibalapteryx fluviata*, Hüb. (*obstipata*, Fab., *gemmata*, Fab.), at ivy blossoms on the same night and restricted area of the ivy-covered walls of the yard at Ummera. The query of my sister may be answered in the affirmative.—C. DONOVAN (Lt.-Col., I.M.S. [ret.]); Bourton-on-the-Water, Glos, October 11th, 1936.

IMMIGRANT LEPIDOPTERA IN OUTER HEBRIDES, 1936.—A considerable number of *Colias croceus* have been seen flying over grassy land on the west coast of the island of Barra, but amongst them only

one female was noted. Of the males one was taken on September 15th, six on the 16th, ten on the 19th, and as many more seen. During this period the weather was fine and warm with a S.S.E. breeze. All specimens were in good condition. There seemed to be some tendency in flight to the northward, but many of the males were obviously searching for mates, flying slowly, examining yellow flowers, such as buttercups, without settling. *Vanessa cardui*, *V. atalanta* and *Plusia gamma* apparently arrived at Barra during the latter part of June; and locally bred imagines, in first-rate condition, are now (September 21st) common, especially *P. gamma*, which is abundant at ragwort. I found *V. cardui* larvae fairly common at the beginning of August and reared six adults. *Pieris brassicae* has been common since middle of June, but only two *P. napi*, both in August.—J. L. CAMPBELL; Northbay, Barra, September 21st, 1936.

DICRANURA BIFIDA: LATE EMERGENCE.—I took a fresh specimen of *D. bifida* at light on August 18th last in a Kentish wood, and in Romney Marsh a specimen of *Pyrrhia umbra* at sugar, also in fresh condition. In another wood, on September 1st, I beat a larva of *D. vinula* in its third instar.—G. V. BULL; Sandhurst, Kent.

CATOCALA FRAXINI AT EASTBOURNE.—A Clifden Nonpareil (*Catocala fraxini*) was captured on September 18th in the General Post Office, Eastbourne, and brought to me. It is in excellent condition, with the exception that the margin of the left fore wing is frayed.—S. A. CHARTRES; 9, King's Drive, Eastbourne, September 19th, 1936,

PLUSIA GAMMA IN NUMBERS DEAD IN SNOW AT 10,000 FT.—While traversing the glaciers at the head of the Val d'Hérens about August 20th large numbers of *Plusia gamma* were observed in the snow in small holes, obviously caused by their own heat, but all the specimens inspected were cold and stiff. A few *Aglais urticae* were also noticed flying at a height of 10,000 ft. At a rough estimate there were about two *P. gamma* per square yard over all the ground covered, which was about 6 miles. The valley is situated in the district of the Valais and south of Sion. Evolena and Arollo are the main villages. The average height of the ground covered was 10,000 ft. *Plusia gamma* was not noticed to be especially common in the lower districts.—DAVID GAUNT; Sergeants, Winchester, Hants.

SESIA TIPULIFORMIS CLERCK IN DUMFRIESSHIRE.—On July 2nd this year I captured three specimens of this Clearwing at rest on leaves of some black-currant bushes in my garden here in Gretna. Again, on July 14th, I saw another, and on the 15th several more, all at rest like the first specimens. This is the first time I have seen this moth here. It is reported as rare in Southern Scotland, and there are only two localities given for it in the Cumberland List.—JAS. MURRAY; 6, Burnside Road, Gretna, Dumfriesshire.

SOCIETIES.

THE SOUTH LONDON ENTOMOLOGICAL SOCIETY.—*August 27th, 1936.*—Mr. N. Niblett, President, in the Chair.—Mr. Jacobs exhibited heads of the Slender Fox-tail Grass from Ditchling (August 18th, 1936), each bearing the bodies of several small Syrphid flies; Mr. Moore, the American Nymphalid *Colaenis julia* ssp. *julia*, taken alive in Rotherhithe; Mr. Syms, the bee, *Osmia bicolor*, taken fully developed from a snail shell; it is unusual for the species to become mature until the spring. Mr. Coulson showed the species of Coleoptera taken during the Gomshall Field Meeting; Mr. Stevens, species of Coleoptera from the Chatham area; Mr. Attwood, the beetle *Cassida rubiginosa*, bred from larvae found on the plume thistle. Mr. Wakely exhibited *Synanthedon (Aegeria) vespiformis*, bred from Tilgate Forest, S. (Æ). *flaviventris* bred from I. of Wight, the Psychid *Pachythelia villosella* from a case found in Dorset by Dr. Bull, and a larva of *Acosmetia caliginosa*; Dr. Bull, a series of *Cosmotriche potatoaria* bred from Kent during the past few years, and gave a short account of his recent visit to Scotland; Mr. Tompkins, *Callimorpha quadripunctaria (hera)* bred from Dawlish larvae. Notes on the season were given by several members.

September 10th, 1936.—The President in the Chair.—Mr. Niblett exhibited galls of *Aulacides hieracii* on hawkweed; Dr. Bull, larvae of *Aplecta oculata*; Mr. Wakely, a bred series of *Myelois neophanes* from various localities, the pink-spotted form of the larva of *Lycaenopsis argiolus*, etc.; Mr. Collins, a collection of recently taken Lepidoptera from Shetland and the Orkney Islands, and read notes on the species and forms met with; Mr. Ford, the life-history of *Melissoblatpes bipunctarius* which he had recently discovered, and gave notes on the same. Mr. T. R. Eagles read a note on the attacks of sparrows on *Plusia gamma*. Mr. de Worms gave a short account of his recent trip to Aviemore. Numerous members spoke of recent experiences in the field.

September 24th, 1936.—The President in the Chair.—Mr. B. A. Cooper, 61, Okehampton Road, N.W. 18; Mr. M. Brown, West Kent Hotel, Bickley, Kent; and Mr. H. James, 41, Carron Road, S.E. 21, were elected members. Mr. O'Farrell exhibited British Dragonflies and their larval cases; Mr. Jacobs, *Coleophora erigerella*, Ford, larvae in seed-heads of *Erigeron acre* from N. Kent, and larvae of *Loxostege palealis*; Mr. Stephens, local species of Coleoptera from the Chatham district; Dr. Cockayne, bred series of *Xanthia fulvago* from Scotland with ab. *flavescens* and ab. *obsoleta*; Mr. Syms, living British grasshoppers; Mr. de Worms, larvae of *Eupithecia extensaria* and of *Cucullia absinthii*; Dr. Blair, a "tortoise" beetle, *Pseudomes omphalia*, found in grape-fruit; Mr. Hawkins, larvae of *Eupithecia centaureata (oblongata)*, and pointed out the variation shown. Mr. Hawkins also reported larvae of *Mimas tiliae* again found on birch. Mr. O'Farrell read a short paper, A Short Introduction to British Dragonflies. Mr. S. Wakely read a short paper, The Isle of Wight as a Collecting Ground for Entomologists.—HY. J. TURNER (*Hon. Editor of Proceedings*).

ENTOMOLOGICAL CLUB.—A meeting of the Entomological Club was held at "Woodhouse", Stroud, on July 29th, 1936, Dr. H. A. Eltringham in the Chair. Members present (in addition to the Chairman): Mr. H. Willoughby-Ellis, Mr. W. J. Kaye. Visitors present: Mr. T. Bainbrigge-Fletcher, Dr. Malcolm Burr, Mr. E. Ford, Mr. H. W. Holloway, Sir Guy A. K. Marshall, Capt. N. J. Riley. The party was received by Dr. and Miss Eltringham, and during the morning a tour of the extensive and picturesque garden was made. The party also inspected the Chairman's laboratory which is constructed to secure the best possible light both for general and photographic work. There is a large roof-light, the main workbench faces a north light, and the whole of the interior is enamelled white. The photomicrographic apparatus is provided with a system of distant controls for the mechanical stage, substage condenser and fine focusing. The removal of air, chloroform vapour, etc. during of embedding in paraffin and celloidin for section-cutting is effected by a hydraulic air-pump of special design, which registers the degree of vacuum and also controls the rate of readjustment of atmospheric pressure. As an annexe to the laboratory there is a photographic dark-room, containing, in addition to a vertical microprojector and other apparatus, an ingenious combined clockwork and electric contact printing machine, which can be set to give any desired exposure for contact printing of papers and lantern-slides.

Nearly all the apparatus has been designed and constructed by Dr. Eltringham in his own workshop, which is fitted with two electrically driven Hines' lathes, and a full equipment of special tools and appliances.

Luncheon was served at 1 o'clock, after which a tour was made of the wonderful Cotswold district in which "Woodhouse" is situated. Unfortunately visibility was not sufficient to allow the more distant views to be seen.

The first point was Wallbridge, famous for its cloth mills, then through Stroud up the Slad Valley to Birdlip, where a halt was made at the top of Crickley Hill, giving a fine view over Gloucester and Cheltenham as far as the Malvern Hills. The haze was not quite so dense at this point and a very considerable portion of the expanse was seen. Thence to Cranham Woods through Painswick and the outskirts of Stroud, through Paganhill and Cainscross up the long Selsley Hill and along the extreme edge of the Cotswolds to the top of Frocester Hill, where an amazing panorama right over the whole of the valley of the Severn as far as the mouth of the Bristol Channel and beyond could be seen. From this point the "Sugar Loaf" mountain at Abergavenny, 45 miles distant, is generally visible, and sometimes the Brecon Beacons still further away. On to Owlpen Manor, through Horsley to Nailsworth and Woodchester, passing the Monastery and Nunnery, we returned to "Woodhouse" *via* Lightpill—a marvellous drive.—H. WILLOUGHBY-ELLIS (*Hon. Secretary*).



A. S. Bucknurst photo.

FRYER — *HYPONOMEUTA RORELLUS* — See page 269.

2.

THE ENTOMOLOGIST.

VOL. LXIX.]

DECEMBER, 1936.

[No. 883]

HYPONOMEUTA RORELLUS IN SUFFOLK AND NORFOLK (LEP.).

By J. C. F. FRYER, O.B.E., M.A.

(With Plate VI.)

IN view of Mr. Goldsmith's interesting note (*Entom.*, 69, 218) of the occurrence of *H. rorellus* in Suffolk, the following further observations on the outbreak may be worth putting on record.

Thanks to Mr. Donnington, of Barnby, near Beccles, larvae were received at the Plant Pathological Laboratory of the Ministry of Agriculture on July 1st. In general appearance and size they resembled those of *H. cognatellus* rather than *H. padellus*, and the majority were nearly full-grown, although a few were still small. As there was no *Salix alba* easily available the larvae were first tried upon Sallow—a narrow-leaved form—but they did not appear to like it, nor did they relish leaves of the true cricket-bat willow (*S. coerulea*), which were subsequently given them. This failure to take to new food-plants may in part have been due to the fact that the larvae were nearly ready to pupate, but it also suggests that they are specific in their tastes.

As soon as the larvae began to pupate an apparent difference between *H. rorellus* and the commoner species was noted, and was believed to rest in the greater contrast in colour between the pale yellow or yellowish-green segments of the abdomen and the sooty black of the remainder of the pupa. Mr. Stringer, of the Natural History Museum, who has kindly read this note, points out, however, that this contrast in colour was just as great in pupae of *H. padellus* with which he was able to compare those of *H. rorellus*, and his observation is borne out by published figures of *H. padellus* pupae.* It is possible that this apparent distinction was due not so much to any colour difference as to the fact that the pupae of *rorellus* were suspended in a relatively more scanty web, so that their coloration was more easily seen (Fig. 1). With *rorellus* the web was dense only at the point of attachment to the cage or tree, and the pupae were suspended side by side in large colonies, often practically uncovered by web. All who were shown the pupae were immediately impressed by the fact that they were different from anything they had previously seen, and the point seems worth mention in case others may have the opportunity of paying more attention to it next year.

On August 1st an opportunity was taken for a brief visit to Beccles, where the species was found in large numbers on a row of

* *E.g.* New York Agricultural Experimental Station, Technical Bull. 24, 1912, pl. iii, figs. 1, 2.

willow trees (*Salix alba* apparently) between Beccles Common and the Waveney. By no means all the willows in the neighbourhood were affected; none, for instance, was seen on the Norfolk side of the Waveney on the main road to Norwich, but where the species was present the trees formed a remarkable spectacle. The trunks were largely covered with a white web, made apparently by the larvae when searching for a place to pupate, and as the moths were then emerging, with moths also. The day was cold and windy, with occasional showers, and very large numbers of the moths had been beaten down into the grass under the trees, where many probably died. The weather rendered a photograph difficult, but a snapshot (Fig. 2) may give some idea of the web and the moths. In view of the vast number of insects present it was rather remarkable that even more damage had not been done to the trees; the latter, of course, presented a very ragged appearance and the old larval nests were conspicuous, but there had not been the complete defoliation characteristic of a bad attack of *H. padellus* on a hawthorn hedge. That the species is potentially a serious willow pest is evident, but in view of its previous rarity in England it may be hoped that the colony is only a temporary settlement, possibly resulting from a migration some five or six years ago, followed by favourable summers. In the affected district the insect is already widely spread, as is evident from Mr. Goldsmith's note, and also from the fact that a single specimen came to light on Rockland Broad in Norfolk late at night on August 9th, thus suggesting a colony somewhere in the valley of the Yare. Since the insect is very sedentary in cold, wet weather, individuals could easily be carried by wherries or even cars for long distances, and it is thus not unlikely that colonies may appear elsewhere in the Eastern Counties.

As to control measures, there should be no difficulty in dealing with the insect by spraying where a few trees of considerable value are concerned, but this treatment would prove too much of an undertaking and too expensive for the ordinary marshland willows, which have little commercial worth. If the species is not reduced again to rarity by climatic factors, control by parasites would seem the most hopeful remedy. So far the only parasite that has been bred from the species is *Herpestomus brunnicornis* Grav., an Ichneumonid common to the genus *Hyponomeuta*. This was noted by Mr. Stringer in the Beccles material he had at the Museum, but no ichneumons whatever were reared at Harpenden from the material from Barnby, distant some three miles from Beccles. *H. brunnicornis* and another species, *Angitia majalis* Grav., are sometimes very destructive to *H. padellus*, and they may therefore prove equally useful in dealing with *H. rorellus*.

FURTHER NOTES ON ZYGAENA ACHILLEAE AND Z. FILIPENDULAE IN THE WESTERN HIGHLANDS.

BY RUSSELL JAMES, F.R.E.S.

SINCE I succeeded in tracking down *Zygaena achilleae* in 1932, as described in the *Entomologist*, 65 : 224, it had been my desire to investigate its habits further.

The right date for the species was a very ticklish question. In a rather backward season the first date that Reid took it was June 27th, with *filipendulae* scarcely out, and in 1932 I found *achilleae* badly worn and *filipendulae* swarming and also getting worn on June 18th. 1932 had been an extremely early season in Scotland, so in 1935 I planned to be on the ground a little earlier. I was, however, again at fault, the Scottish season being, if anything, more forward than ever and *achilleae* practically over. Hard work on my part only produced five specimens in four days, of which four were very worn, but I secured a most interesting lot of *filipendulae*, which abounded almost everywhere in the district.

Very dissatisfied with this result and convinced that *achilleae* would be reasonably plentiful at the right time, I determined this year to try a much earlier visit. The day following my arrival proved to be a fine sunny one, and a close morning's work resulted in a single freshly-emerged, but crippled specimen. In the afternoon three good specimens were taken on the wing close together, all freshly emerged. For the next three days the weather rained and blew unceasingly, leaving me only one more day. This happily was ideal, and ten fine specimens were taken—one of them a nicely confluent form. The species was coming out fast, and would probably have been more plentiful after I left.

Z. filipendulae was in nothing like the numbers of the previous year, and was evidently not fully out. In fact I found a fair number of unemerged pupae, but could find none of *achilleae*. I searched very carefully round the spot where the first crippled specimen was taken—right down to the grass roots—but could find no trace of the empty cocoon. *filipendulae* here does not spin up on the grass-stems, and all the pupae I found were fairly low down on heather. While *filipendulae* are fresh, as they were this year, the two species are easily distinguished, even on the wing, *achilleae* looking a poor dull-coloured insect by comparison, while any doubt there may be is quickly dispelled when in the net by its conspicuous yellow legs, seen through the net as it crawls up the side. It is far more active than I anticipated, all but two being taken on the wing. I had imagined that its habits would have been much more

like those of *Z. meliloti*, but it was, in fact, distinctly more active than I have ever found *Z. exulans* to be.

I mentioned in my 1932 notes how strikingly *filipendulae* varies here towards the *achilleae* form, and further examination proves that more specimens than not have the apical pair of spots either actually joined, or at least some degree of red scaling connecting the two. For such a usually constant species as *filipendulae* the amount of variation is extraordinary, and extends in extreme cases into all the spots being united into one irregular blotch—not as clearly outlined as in extreme forms of *trifolii*, but rather blurred, as in *purpuralis*.

Although I imagined the two species were too far apart to interbreed, yet this local variation is very suggestive, and is emphasized by the fact that occasional specimens of *filipendulae* have a very slight tendency when alive towards yellow scaling on the legs, although this disappears after death. That they may actually interbreed occasionally was proved by finding a female *achilleae* paired with a male *filipendulae*. Unfortunately an accident prevented the specimen being kept for eggs, or interesting results might have been obtained.

Although, as I expected, *achilleae* proved to be moderately plentiful, it is nothing compared with the great numbers of *filipendulae*, and I cannot understand Reid's remarks that it outnumbered the latter by ten to one. The proportion the other way round would still vastly understate the case, and I can only assume that for some reason in that year the natural emergence of *filipendulae* was delayed and it was not out. Even so, I should have supposed that plenty of pupae would have been in evidence.

With the weather experienced there was not much chance of other collecting, but a nice series was taken of the Scottish form of *Eulype hastata*, which was in lovely condition and flew freely in the sun, pretty well everywhere—a few *Eppirrhoe tristata* among them.

Treacle was attractive on the two nights that were possible, the commonest moth being a dull purplish-grey form of *Hadena pisi*, which had no tinge of our southern red tone.

Many lovely *Xylophasia rurea* and var. *combusta* were there, and among other things a few fine *Acronycta menyanthidis*, some dark *Acronycta rumicis* and a very dark form of *Hadena contigua*. Several fine *Anatris plagiata* were walked up—a very large bluish-toned form—but the handsome race of *Polyommatus icarus* which occurs here was only just starting, a couple of males only being seen.

As a heat wave appeared to be starting when we left, I greatly regretted that I was compelled to be back in town and could not

stay longer. On the journey back we made a detour to the spot where, in 1932, I had found *Emmelesia blandiata*, but it appeared not to be out, although very ordinary *E. albulata* were in great abundance. Throughout our journey *hastata* appeared everywhere, flying in the sun repeatedly until we had reached built-up areas.

However, although hampered by weather, I have been able to confirm that *achilleae* is really an established Burnet of the district, although I do not consider it "the" common Burnet Reid stated it to be.

Lynton House,
Bishopswood Road,
N. 6.

VANESSA CARDUI AND POLYGONIA C-ALBUM IN WEST CORNWALL.—I saw in a garden by the village of Angarrack, amongst a host of Tortoise-shell butterflies, many *V. cardui*. Four of them that I was able to get quite close to were flawless specimens. I also saw on October 3rd a *P. c-album* on the cliff's edge—a perfect specimen. I am very familiar with that district, but have not before seen *c-album* there.—HAROLD HODGE; 9, Highbury Place, N. 5.

VANESSA ATALANTA AB. FRACTA.—With reference to Lieut.-Col. Peile's note (p. 181), I have made tolerably full descriptions of the individual specimens of *V. atalanta* taken here this summer in connection with my marking experiments. The name ab. *fracta*, Tutt., is applied to specimens in which the "red transverse band on the fore wings varies in that there is . . . a distinct separation at about the centre into two parts by the special development of the black ground-colour along the nervure there" (*Brit. Butt.*, p. 355). Sometimes, as Tutt adds, "the break is only partial". An analysis of 31 English-born examples taken here between September 16th and October 4th shows that 10 (5 male, 5 female) had no projection of the black scaling across the red band; 1 male had hardly any projection; 1 male had it very slight, not half-way across; 5 (2 males, 3 females) had it half-way across; 5 (2 males, 3 females) had it two-thirds across; 8 (2 males, 6 females) had it across; and 1 female had the black projection across the red band, but represented by scattered scales only. In this small series, taken at random, there is every possible stage of the development of the black bar across the red band, and over 25% could be put down as ab. *fracta*. I noted that some of the immigrants, taken earlier in the season, had a distinctly orange tint on the red band, and this may possibly be indicative of a southern origin. Tutt (*loc. cit.*, p. 356) stated that the white dot in the red band "occurs in almost, if not all female specimens, but is also frequently found in the male". Out of 63 specimens, taken and released here, in which this character was noted, I find that it was present in 11 males and 12 females, and absent in 23 males and 17 females. These included both immigrants and locally-bred examples.—T. BAINBRIGGE FLETCHER; Rodborough, Glos, October 20th, 1936.

THE BUTTERFLIES OF ST. KITTS.

BY ARTHUR HALL, F.R.E.S.

THE Lesser Antilles are so poor in insects as compared with the mainland of Tropical America or even the larger West Indian islands that they have been much neglected by entomologists, in spite of the many interesting problems they afford.

The small island of St. Kitts, the most northerly of the Leeward Islands, has been so little visited by lepidopterists that previous to my stay there last year I was able to find records of only about a dozen species of butterflies. In the latter part of December, 1935, I spent some ten days in collecting near Basse Terre and seem to have struck an unusually favourable period, the number of specimens on the wing being much greater than is usual in these small islands. Practically all my collecting was done in two localities, namely, on Monkey Hill, within a few minutes' walk of my comfortable quarters at Shadwell House, and on the slopes of the central knot of hills leading up to Mt. Misery (3700 ft.), the highest elevation I attained, however, being about 2000 ft. The number of species I obtained was thirty-six, which included all those previously known, and this so closely agrees with the number known from the other islands of this group in which any serious collecting has been done (Dominica 38 species, St. Lucia 32, Grenada 30) that there is probably little else to be found, although some additions to the *Hesperiidae* are likely.

A most interesting feature of St. Kitts' butterflies is the presence of several species (*Heliconius charithonia*, *Anaea troglodyta*, *Phyciodes pelops*, *Terias lisa*) which have evidently been derived from Jamaica and Hayti and do not extend to Dominica, whilst others (*Megalura peleus* and *Terias leuce*) have apparently come to the island *via* Trinidad and Dominica, and are not found in the Greater Antilles.

My experience here, as in Dominica and Grenada, seems to suggest that the primeval forests of the higher mountains in the Lesser Antilles have no peculiar butterflies at all, since collecting in the cool, wind-swept altitudes above 1200 ft. yielded nothing but species which are found in much greater numbers at lower elevations.

1. *Danaus plexippus* L.

Common in many places.

2. *Papilio polydamas christopheranus* ssp. nov.

♂♀. Nearest to *P. polydamas thymus* R. & J., but differs from it and from all other races in the small anterior spots in cellules

6 and 7 of the fore wings being placed more distal than the rest of the band, and in the band of the hind wings, which is straight and remote from the margin, being *slightly but distinctly narrowed* posteriorly. Underside marked as in *thyanus*, but the ground-colour much blacker, as in the races from St. Vincent and Grenada.

Habitat.—St. Kitts; 9 ♂♂, 2 ♀♀, mostly taken at an elevation of about 800 ft. Also a co-type in the British Museum.

3. *Pieris monuste virginia* Godt.

Very abundant. Here and in Dominica both sexes generally have the underside of the hind wings bright yellow without markings and are very different from the Jamaican race, which is often placed under this name.

4. *Appias drusilla poeyi* Butl.

Several males at the top of Monkey Hill. In the absence of the female it is impossible to say whether the form is true *poeyi* or some other race.

In Grenada I took a race which I propose to call **monomorpha** subsp. nov. The female is wholly white, like the male, without any black scaling at the apex or base of fore wings and without the yellow mark at the base of hind wings beneath.

5. *Terias lisa* Bois. & Lec.

Abundant everywhere.

6. *Terias leuce antillarum* subsp. nov.

♂♀. Smaller than the typical race from the mainland, the black margin of fore wings less than half as wide, only 1 to 1.5 mm. as against 3 to 4 mm.; the female is also much paler whitish yellow.

Habitat.—St. Kitts; 16 ♂♂, 7 ♀♀. Dominica, 7 ♂♂. St. Lucia, 1 ♀. Specimens from the island of Tobago are intermediate. This species differs in habits from most of its genus, flying in wooded places and settling on the underside of leaves.

7. *Terias दौरα palmyra* Poey.

Very abundant.

8. *Terias elathea* Cram.

Common with the preceding, but not quite so abundant.

9. *Catopsilia eubule* L.

Very common.

10. *Catopsilia trite* L.

Rather scarce. Some specimens have the brown line of the underside nearly obsolete.

11. *Heliconius charithonia punctata* subsp. nov.

♂♀. Differs from the widely distributed typical race in the presence of an additional yellow spot in cellule 3 of the fore wings. This spot varies from a mere dot to a maximum length of 8 mm. and breadth of 2 mm., and is only absent in one out of nearly a hundred specimens captured. There is also a tendency for the oblique discal band to extend slightly below vein 4, and there is a marginal dot above the end of that vein and an additional dot below the distal end of the long basal stripe.

Habitat.—St. Kitts; a long series. Antigua, 1 ♀ in the British Museum.

12. *Colaenis julia warneri* subsp. nov.

♂. Nearest to *C. julia dominicana* Hall, but on the fore wings the apical half of the outer margin is more broadly fulvous, the wedge-shaped black spots in cellules 4 and 5 not reaching the margin, the oblique black band less inclined to be narrowed at the lower radial. Hind wings with the black admarginal line only fairly indicated, the submarginal lunules less black and less sharply defined.

♀. Only differs from *dominicana* ♀ in the apex of fore wings being more broadly margined with fulvous.

Habitat.—St. Kitts; rather scarce, 7 ♂♂, 2 ♀♀.

13. *Dione vanillae* L.

Not very abundant.

14. *Phyciodes pelops* D.

Generally distributed in the island, but always singly in isolated specimens.

15. *Precis lavinia genoveva* Cr.

Very common. Although specimens from the Lesser Antilles are too inconstant to receive separate names, those from St. Kitts are, in a series, distinctly different from those from Dominica on the one hand, and from Jamaica on the other.

16. *Anartia jatrophae* L.

Only two specimens.

17. *Didomis biblis* F.

Very abundant, the specimens fine and large.

18. *Megalura peleus* Sulz.

Rare. Only one specimen taken, and one or two others seen at an elevation of about 800 ft. The examples from St. Kitts and Dominica are quite typical *peleus*, and not transitions to *M. eleucha* Hbn. as I should have expected.

19. *Hypolimnas misippus* L.

I took a male in the garden of Shadwell House and saw a female on Monkey Hill.

20. *Anaea troglodyta minor* subsp. nov.

♂♀. Much smaller than typical *A. troglodyta* F., the fore wings less falcate. The irregular dark discal band of fore wings heavier, the brownish marginal band with a more marked projection in cellule 3, so that the intervening band of the ground-colour is interrupted or distinctly contracted at vein 4; blackish-brown costal spot of hind wings small or obsolete.

Habitat.—St. Kitts; 16 ♂♂, 5 ♀♀. Rather common along the edges of the cane-fields and fond of settling on the sugar-cane.

21. *Hemiargus hanno* Stoll.

Very abundant.

22. *Hemiargus ammon* Luc.

Rather scarce.

23. *Leptotes theonius* Luc.

Perhaps the commonest butterfly in the island.

24. *Strymon bubastus* Cr.

Generally common.

25. *Stryman acis* D.

A few specimens on the flowers of low bushes.

26. *Strymon angerona* G. & S.

Two or three examples.

27. *Strymon simaethis* D.

A single female.

28. *Urbanus proteus proteides* Plötz.

Moderately common.

29. *Urbanus santiago retractus* Plötz.

Very abundant. Many of the males differ from those from the other islands in the complete obsolescence of the hyaline spots of the fore wings.

30. *Epargyreus zestos* Hbn.

Two specimens.

31. *Acolastus amyntas* F.

Fairly common.

32. *Pyrgus syriethus* F.

Common.

33. *Hylephila phylaeus* D.

Not very abundant.

34. *Catia gemma* Plötz.

Very common.

35. *Calpododes ethlius* Cr.

A single specimen.

36. *Panoquina sylvicola* H.-S.

Abundant amongst the sugar-cane upon which the larva feeds.

PUPATION OF *ASTEROSCOPUS NUBECULOSA*.—In 1934 I was fortunate to have a number of ova of this moth. I had no difficulty in rearing the larvae, and brought over 100 to the full-fed stage, but the proportion which pupated was very poor, not more than 50%. Having read in Buckler's *Larvae* that some he reared pupated on the surface of the soil, I did not suppose the larvae required any great depth of pupating material, and so only gave them receptacles some 4 or 5 in. deep. Only one moth appeared in 1935, but I had a good emergence this (1936) spring, and, getting a pairing, I reared another batch. With the object of finding out if the depth of the pupating material had anything to do with the previous failure in pupation I used two wooden receptacles of rectangular shape and a 10-in. flowerpot, all of about 9½ in. depth. When I took out the pupae I took special care in their removal in order to find out at what depth the greater number pupated. The results were similar in each case, except that in the flower-pot every larva that went down pupated. The numbers at the various depths were as follows: Up to 3 in. 9, 3 in. to 6 in. 35, 6 in. to 8 in. 33, and below 8 in. 2, making 79 pupae out of 87 larvae going down—not at all a bad percentage. This seems to suggest that the greater number of *nubeculosa* larvae pupate at a depth of between 3 in. and 8 in., and should be given at least the latter depth of pupating material.—C. RIPPON, M.A., F.R.E.S.; Red Lodge, Cold Ash, Newbury, Berks.

RHITHROGENA SEMICOLORATA CURTIS AND *R. SEMITINCTA* PICTET (EPHEMEROPTERA).

By D. E. KIMMINS.

In the course of his collecting trips to various parts of France and Switzerland, Mr. M. E. Mosely has brought back many Ephemeroptera, and amongst them are numerous examples of a *Rhithrogena* somewhat resembling *semicolorata* Curtis. Eaton, in his Monograph (1885), records that *R. semicolorata* Curt. is widely spread in Europe,

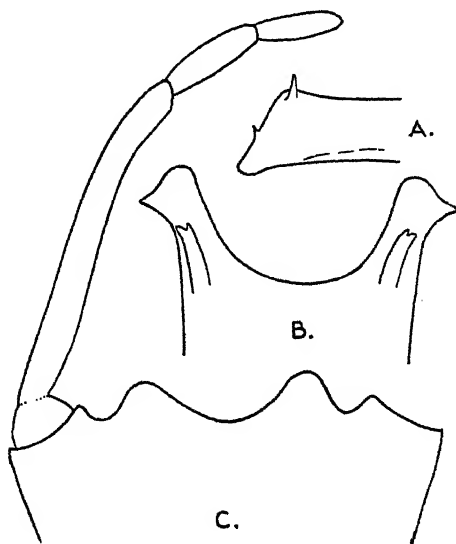


FIG. 1.—*Rhithrogena semicolorata* Curtis ♂. A, Penis lobe from side. B, Penis lobes from beneath. C, Forceps-base from beneath.

and exhibits considerable variation in the colour and extent of the wing-pattern. Mr. Mosely's captures also show a range of variation from almost colourless to rich brown wings.

The British examples of *semicolorata* Curt. are comparatively uniform in their wing coloration, therefore, out of curiosity, I compared the genitalia of British and Continental examples which had been cleared in caustic potash. This revealed certain differences, and examination of numerous specimens from France and Switzerland failed to reveal a single typical British *semicolorata*.

Eaton divided his *R. semicolorata* into three groups: typical, and Variations I and II. Under the heading of the typical form he

quotes *semitincta* of Pictet. Through the courtesy of Dr. J. Carl, of the Geneva Museum, I have been able to examine examples of *semitincta* and *semicolorata* from the Pictet Collection. As a result of this, I am of the opinion that *Rhithrogena semitincta* Pictet should be reinstated as a distinct species in the European list. Pictet's *R. semicolorata* is a more strongly coloured form of his *R. semitincta*. Eaton's *R. semicolorata* var. I is also of this form. Specimens with unicolorous brownish wings (Eaton's var. II) appear also to belong to *semitincta*.

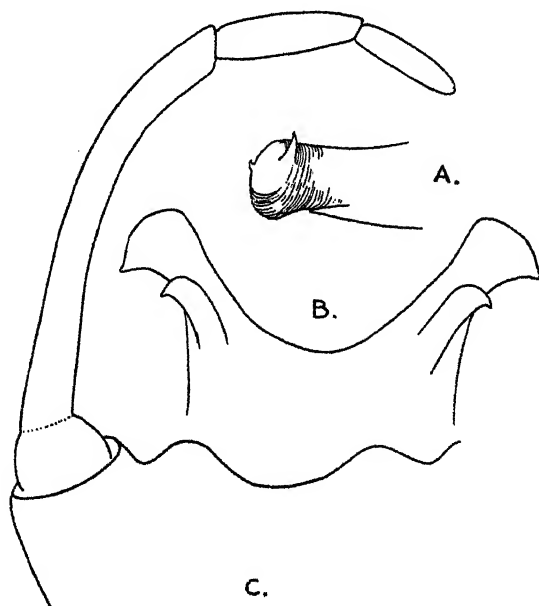


FIG. 2.—*Rhithrogena semitincta* Pictet ♂. A, B and C as in Fig. 1.

The differences in ♂ genitalia between the two species may be summarized as follows :

R. semicolorata Curt. (Fig. 1).—Penis lobe in lateral aspect distinctly truncate at apex ; two small hook-like spines at apex, one on outer upper angle, one on inner margin. In ventral aspect with the outer apical angle produced outwards, apical margin sinuous.

R. semitincta Pict. (Fig. 2).—Penis lobe in lateral aspect with apex rounded, not obliquely truncate ; two hooks much as in *semicolorata*. In ventral aspect with the apex more rounded than in *semicolorata*.

NEW FORMS OF PAPILIO FROM THE INDO-AUSTRALIAN REGION.

BY A. G. GABRIEL, F.R.E.S.,

Department of Entomology, British Museum (Natural History).

THE re-arrangement of the Papilionidae from the Indo-Australian region in the British Museum, with the consequent addition of much recently acquired material, has brought to light several forms which appear to be worthy of description.

***Papilio fuscus nomus* ssp. nov.**

♂. *Upperside*.—Fore wing uniformly brown except for slight indications of post-discal yellow spots in interspaces 1–4. Hind wing brown; a tail similar to *hypsicles*; a row of pale yellow spots forming a discal band, which tapers considerably towards the anal angle; beyond this an ill-defined post-discal row of dusted blue spots; a faint trace of an orange anal spot. *Underside*.—Both wings brown. Fore wing with a complete post-discal row of pale yellow spots dusted with brown. Hind wing: A discal band of pale yellow spots and a post-discal row of blue lunules; an indistinct submarginal row of orange spots dusted with brown; a small orange anal spot.

Appears to be nearest to *hypsicles* Hew., but differs in the almost complete absence of the fore-wing band of spots and the much straighter hind-wing band.

Lo Id., Torres Isl., N. of New Hebrides, September, 1900 (Cmdr. J. J. Walker). 1 ♂. B.M. Type No. Rh. 420.

***Papilio memnon memnon*, ♀ f. *walteri* nov.**

Upperside.—Fore wing with a small reddish basal spot; a large greyish-white subapical marking which extends into apex of cell as in *gyrtia*. Hind wing without tail; a broad greyish-white area extending from the posterior margin to the second radial, interrupted by the veins. This greyish-white area reaches from just beyond the cell to a row of large blackish-brown submarginal spots. *Underside*.—Rather like ♀ f. *imperiosa*, but the whitish area of hind wing not extending into interspace 7; only a trace of orange at the tornus.

Billiton Id. (Walter; ex Godman-Salvin Coll.). 1 ♀. B.M. Type No. Rh. 422.

***Papilio memnon memnon*, ♀ f. *eos* nov.**

Upperside.—Fore wing: Ground-colour somewhat paler than *hiera*; a small basal reddish spot slightly dusted with blackish-brown. Hind wing without tail; basal half of wing paler than *hiera*; a broad whitish post-discal band extending from costa to posterior margin,

reaching from just beyond cell to the large blackish-brown submarginal lunules; a well-marked row of brownish-white marginal lunules. *Underside*.—Fore wing: A greyish-white lunule in each of interspaces 1-4. Hind wing: The basal area almost black; the post-discal band as on upperside; marginal lunules whitish.

Nearest to ♀ f. *hiera* Jord., but distinguished by the hind-wing band reaching the costa and the strongly marked pale marginal lunules.

Kangean Id. (Buitenzorg Mus.). 1 ♀. B.M. Type No. Rh. 421.

***Papilio polyctor stockleyi* ssp. nov.**

♂. *Upperside*.—Fore wing black, very lightly dusted with green scales; two cream-coloured patches 10 mm. in length, one on each side of submedian near the tornus. Hind wing black; lightly dusted with blue and green scales; a small blue patch in interspace 6 extending into interspace 7 as far as the discocellular, but not entering cell and not reaching submarginal lunules; a row of 7 submarginal lunules, the first two blue and the other 5 purple lined with blue. The *underside* does not differ from *significans* except that the white marginal lunules are much more strongly marked.

Appears to be nearest to ssp. *significans* Fruh., but is characterized by the cream-coloured stripes on fore wing and the very small blue patch on hind wing.

1 ♂. B.M. Type No. Rh. 423. Hot Springs, Melamoung, W. Siam, 2000 ft., April 15th, 1920 (Col. C. H. Stockley). 1 ♂. Taok Plateau, Dawnas, April, 1925 (C. R. E. Cooper).

OEONESTIS QUADRA L.: IS IT A MIGRANT?—At Hastings on August 10th to 12th Mr. H. G. Macleod took three females and a male at light in the covered parade at Hastings; on August 13th Dr. R. C. Lowther took a female at Grange-over-Sands, and he states that last year on July 7th Mr. Hulme Wilson took a male at Kirkby Lonsdale, Westmorland. In 1933 and 1934, in the New Forest, where it abounds in some seasons, on July 23rd and 21st respectively Mr. C. G. M. de Worms took females (*Entom.*, 67: 101 and 68: 102). Similar widespread captures led R. South, in *Moths of British Isles*, Series I, p. 180, to state "one is led to suspect that the insect has migratory habits". According to R. Adkin, *Moths of Eastbourne*, Part I, the species occurred freely at sugar about 1870-5, but is believed to have been absent in Sussex recently until found at Hastings, as noted above. It is quoted by Lt.-Col. C. Donovan as locally abundant in the south of Ireland at Curraghmore and Ummara. Is there any evidence that the species migrates? and if so, where from?—T. DANNREUTHER (Capt., R.N.); Windycroft, Hastings, November 10th, 1936.

DESCRIPTIONS AND FIGURES OF NEW BRAZILIAN DRYOPIDAE (COLEOPTERA).

By H. E. HINTON,

Zoological Laboratory, Cambridge.

THIS paper deals with a new species of *Elsianus* sent to me four years ago by the late Dr. H. Luderwaldt, and two new species of *Heterelmis* recently received from Dr. Fritz Plaumann.

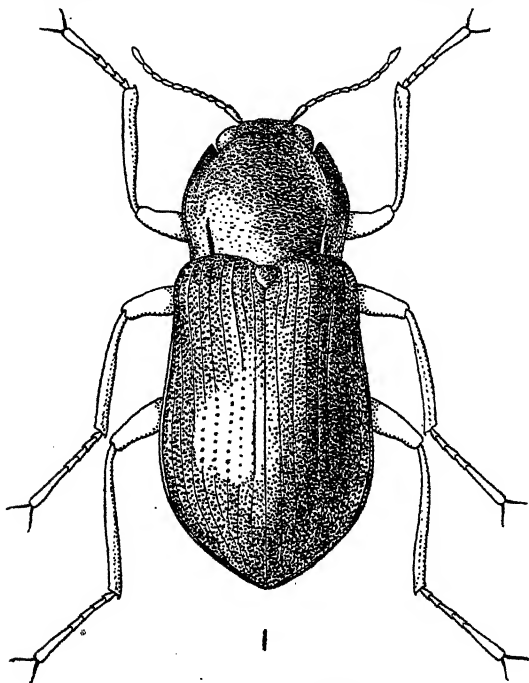


FIG. 1.—*Elsianus salti* Hinton.

My best thanks are due to Dr. A. D. Imms and Dr. K. G. Blair for their help and encouragement during the preparation of this and other papers dealing with these interesting water-beetles. For the figure of *Elsianus salti* I am indebted to Miss O. F. Tassart. The figures of parts were drawn by myself with the aid of a camera lucida. Lines next to figures refer to a length of 0.2 mm.

***Elsianus salti* Hinton, sp. n. (Figs. 1-3.)**

Male.—Length, 5.2 mm.; breadth, 2.25 mm. Subparallel, moderately convex. Dorsal surface clothed with fine, short (about

0.5 mm. long), recumbent, brownish-testaceous hairs, which are separated at bases by intervals equal to about or slightly more than their lengths; ventral surface densely and finely tomentose laterally and medially clothed as dorsal surface. Cuticle throughout finely alutaceous; black to rufo-piceous; antennae, mouth-parts and legs paler rufo-piceous. Head without distinct impressions; margin on each side above antennal base moderately prominent. Clypeus with the anterior margin feebly, arcuately emarginate for its entire breadth, and with the angle on each side broadly rounded. Anterior margin of labrum when viewed from above feebly, broadly, and arcuately

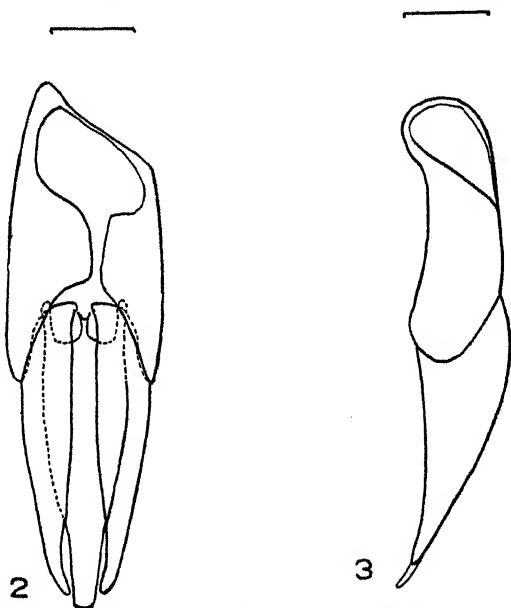


FIG. 2.—Dorsal view of male genitalia of *Elsianus salti* Hinton.

FIG. 3.—Lateral view of same.

emarginate at middle and with the angle on each side broadly rounded; when viewed from front with the margin of the labrum truncate. Surface with round granules which are slightly finer than facets of eyes and are separated by two to four times their diameters (the hairs with which the surface is clothed arise from the tops or sides of the granules); clypeus with the granules about a third larger and correspondingly denser; labrum punctate, the punctures being about as coarse as cephalic granules and generally separated by less than to once their diameters; punctures absent on a narrow anterior medial belt. *Prothorax* with broadest point, which is at basal half, broader than long (1.80 mm. : 1.52 mm.), and base broader than apex (1.67 mm. : 1.12 mm.). Apical margin at middle very feebly and arcuately emarginate for a short distance; sides moderately

converging towards apex and moderately strongly arcuate, before basal angles distinctly sinuate. Pronotum with the sublateral carina present only on basal two-fifths, elsewhere moderately evenly convex; surface granulate, the granules about a third coarser than those of labrum and separated by less than to two times their diameters; where granules are rubbed off punctures are left of the same diameter and about the same density. *Elytra* more than two times as long as prothorax (3.92 mm. : 1.52 mm.), and feebly broadening posteriorly to broadest point on apical one-third, which is about two-sevenths broader than base (2.25 mm. : 1.77 mm.). *Humeri* feebly gibbous. Surface striate, with the striae becoming finer towards apex and coarser and deeper towards sides; stria punctures round to feebly subquadrate, those on middle of disc being about two-thirds as broad as intervals and separated longitudinally, by or slightly more than, once their diameters. Apices moderately produced, conjointly feebly acute, nearly truncate but individually diagonally truncate. Scutellum subovate, longer than broad (0.27 mm. : 0.25 mm.), moderately feebly convex, and with the surface granulate as pronotum. *Surface beneath* similarly granulate to pronotum and elytra, but on lateral regions with the granules more elongate and slightly sparser; on medial regions slightly denser and often coarser, though here, except for the abdomen, the surface is also often rugose. *Genitalia* as figured (Figs. 2 and 3).

Type.—Male in the collection of the author. Brazil: Sao Paulo, April, 1924 (*H. Luderwaldt*). *Paratype*: A male with the same data as above.

Comparative notes.—This is the only species so far described which has abbreviated sublateral pronotal carinae. I take great pleasure in naming this species in honour of Dr. George Salt.

***Heterelmis pubipes* Hinton, sp. n. (Figs. 4–6.)**

Male.—Length, 1.9 mm.; breadth, 0.85 mm. Obovate, moderately strongly convex. Dorsal surface clothed with fine, short (usually about 0.03 mm. long), recumbent to suberect testaceous hairs, which are generally separated—at bases—by intervals distinctly greater than their lengths; on elytra some of the hairs are three to four times as long as the majority and are erect and very sparse; ventral surface similarly clothed, but with the pleural region of the thorax clothed for the most part with a fine, dense, scale-like tomentum; middle legs with a fringe of extremely long, fine, golden-testaceous hairs on outer posterior margin of tibiae (Fig. 4). Cuticle only occasionally alutaceous, strongly shining; rufo-testaceous (areas on prothorax and elytra, antennae, mouth-parts and legs) to rufo-piceous (ventral surface); head, discal and basal regions of prothorax and elytra (*cf.* Fig. 5) black. *Head* without distinct impressions, but with the region between antennal bases moderately convex; eyes more approximate than usual in this genus, being on vertex almost as close as antennal bases (0.18 mm. : 0.15 mm.); anterior

margin of clypeus truncate and with the angle on each side broadly rounded; anterior margin of labrum broadly truncate and with the angle on each side broadly rounded. Surface densely alutaceous, rugulose, and with round granules, which are about two-thirds as coarse as facets of eyes and are usually separated by one to two times their diameters; labrum free of these granules, extremely finely punctate, and transversely alutaceous. *Prothorax* with the

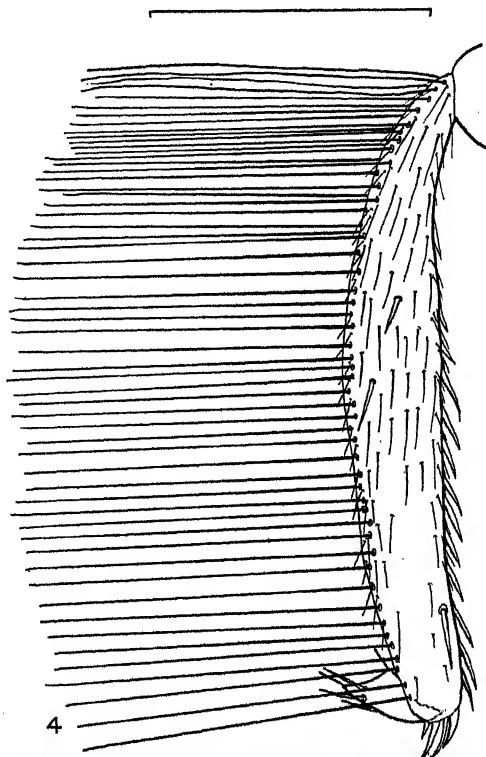


FIG. 4.—Posterior view of middle tibia of *Heterelmis pubipes* Hinton.

broadest point, which is at basal third, broader than long (0.71 mm. : 0.55 mm.) and base broader than apex (0.70 mm. : 0.44 mm.). Apical angles feebly produced forwards and feebly acute; apical margin strongly arcuate at middle (unusually so for *Heterelmis*) and deeply, arcuately sinuate on each side behind eye before apical angle; sides moderately converging towards apex, feebly arcuate except at basal third, where they are moderately strongly arcuate, feebly sinuate at apical third and before basal angles; basal angles not prominent, feebly acute, nearly rectangular; basal margin, as usual in *Heterelmis*, trisinuate, broadly and deeply so on each side and narrowly and shallowly so in front of scutellum. Pronotum

with the sublateral carina scarcely attaining apical fifth, from basal fourth to basal three-fifths about four times as broad; with a feeble impression extending from base in front of scutellum to middle of disc, where it becomes a broad, moderately deep, subovate impression, which is narrowed anteriorly and extends to apical fifth; with a feeble (in certain lights difficult to see) transverse impression extending across discal subovate impression to swollen portion of sublateral carina on each side. Surface with the discal and basal region with punctures which are round, about as coarse as facets of eyes, and separated by one to four times their diameters; apical and lateral regions with round granules which are as broad to twice as broad as facets of eyes, and are separated by two times their diameters or in some instances are nearly contiguous. *Elytra* twice as long as

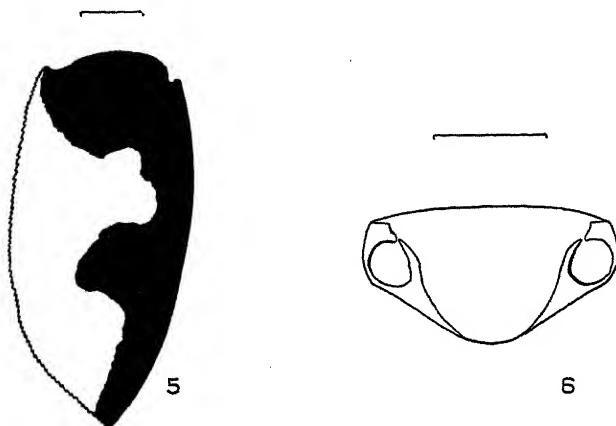


FIG. 5.—Right elytron of *Heterelmis pubipes* Hinton drawn to show maculation.

FIG. 6.—Dorsal view of last abdominal sternite of the same.

prothorax (1.17 mm. : 0.55 mm.), and from base, which is slightly broader than prothoracic base (0.71 mm. : 0.70 mm.), feebly broadening posteriorly to broadest point at apical two-fifths, which is 0.85 mm. broad. Humeri only very feebly gibbous. Inner (nearer to suture) carina (the usual row of granules) extending slightly beyond apical fifth; outer carina only extending to apical two-fifths. Surface without distinct striae, but with the punctures in distinct rows; punctures on discal region deep, round to subquadrate, about a fifth to a third as broad as intervals, and separated longitudinally by a third to slightly more than once their diameters; towards apex, particularly on sutural row, these punctures become finer and sparser, and towards sides denser and slightly coarser; intervals with only the fine, sparse punctures which give rise to the hairs. *Scutellum* subovate, with the base broadly rounded and the apex somewhat pointed, as long as broad (0.13 mm.), flat, and with the surface

punctate as adjacent elytral intervals. *Surface beneath* for the most part punctate as elytral intervals, but occasionally with punctures similar to those of pronotal disc; on antero-lateral portion of prosternum with a few sparse granules. Prosternal process very broad opposite middle portion of front coxae, then converging markedly for a short distance towards apex, and then with sides parallel to apex, which is broadly truncate. Metasternum with the median longitudinal impression fine and nearly attaining anterior margin; disc on each side of middle with a large, shallow, irregular impression, the bottom of which is irregularly rugose; on each side of disc a carina-like ridge extends from middle coxa nearly to hind coxa. Dorsal view of apical abdominal sternite as shown in Fig. 6. *Genitalia* with the length ratio of the parameres to basal plate 0.212 mm. : 0.225 mm.; parameres and median lobe evenly narrowed to apex, and both without hairs of any sort; median lobe extending beyond parameres for a length of 0.013 mm.

Female.—Externally similar to male.

Type.—In the author's collection. Brazil: Santa Catharina, Nova Teutonia, 1934 (*F. Plaumann*). *Paratypes*: Four with same data as above. One of these has been deposited in the collection of Dr. P. N. Musgrave.

Variations.—The maculation is slightly different in each of the five specimens before me.

Comparative notes.—This species can only be compared with *Heterelmis rufo-marginata* (Grouv.) (1888) (*nec Elmis*), but differs in having a much shorter body (1.9 : 2.5 mm.), in having the middle tibiae with a fringe of extremely fine hairs, and base of elytra black instead of rufo-testaceous.

***Heterelmis limnoides* Hinton, sp. n.**

Male.—Length, 1.72 mm.; breadth, 0.85 mm. Obovate, moderately convex. Dorsal surface clothed with fine, short (about 0.02 mm. long), recumbent to suberect, testaceous hairs, which at their bases are separated by intervals equal to about their lengths; ventral surface densely tomentose at sides (tomentum often merging into a scale-like covering), and on middle portion clothed somewhat similarly to dorsal surface. Cuticle for the most part extremely finely, sparsely alutaceous and moderately shining; dark rufo-piceous, antennae, mouth-parts and legs paler, nearly testaceous. *Head* without distinct impressions; anterior margin of clypeus moderately deeply, arcuately emarginate for its entire breadth and with the angle on each side rounded; anterior margin of labrum when seen from above appears feebly arcuate at middle, but when seen from front is truncate; angle on each side rounded. Surface (in the unique specimen before me the surface is, for the most part, encrusted with dirt, which I have been unable to remove without danger to the specimen) apparently with numerous granules, which are slightly finer than facets of eyes and also extremely densely alutaceous; the

anterior margin of the clypeus and most of the labrum finely and moderately densely punctate. *Prothorax* at broadest point, which is at basal two-fifths, nearly a third broader than long (0.75 mm. : 0.55 mm.) and base broader than apex (0.72 mm. : 0.45 mm.). Apical angles prominent, strongly produced forwards, and feebly acute (rounded at extreme tips); apical margin broadly, moderately arcuate at middle and deeply sinuate on each side behind eye before apical angle; sides moderately converging towards apex, feebly arcuate, but more strongly so at basal two-fifths, and feebly sinuate before basal angles; basal angles feebly acute, nearly rectangular; base trisinuate, broadly and deeply so on each side, narrowly and shallowly so in front of scutellum. Pronotum with the sublateral carinae complete and feebly sinuate at basal two-fifths; disc without longitudinal or transverse impressions of any sort—that is, evenly convex. Surface between sublateral carinae with round to irregular punctures, which are generally about as coarse as facets of eyes, though often very much finer (there is a complete intergradation between coarse and fine punctures), often contiguous, and seldom separated by as much as their diameters; sides between sublateral carina and lateral margins set with granules slightly finer than facets of eyes, and separated by one to three times their diameters. *Elytra* twice as long as prothorax (1.15 mm. : 0.55 mm.), and from base broadening posteriorly to broadest point at basal half, which is broader than base in ratio of 0.85 mm. : 0.75 mm. Humeri very feebly gibbous. Lateral elytral carinae as usual in the genus. Surface distinctly but feebly striate; stria punctures usually round, about a third or more as broad as intervals, and separated longitudinally by once to twice their diameters; these punctures, as usual, become finer towards apex and coarser and deeper towards sides; intervals with punctures similar to those of head but sparser. *Scutellum* subovate, flat, broader than long (0.11 mm. : 0.10 mm.), and with the surface sculptured as adjacent elytral intervals. *Surface beneath* punctate mostly as elytral intervals, but slightly more coarsely so. Prosternal process as usual in this genus. Metasternum with the median longitudinal impression nearly attaining anterior margin; disc feebly convex, without other impressions. First abdominal sternite with the medial portion not depressed, with the sublateral ridge present and attaining second sternite. *Genitalia* with the parameres and median lobe evenly narrowed to apex; median lobe extending a short distance beyond apices of parameres.

Type.—Male in the author's collection. Brazil: Santa Catharina, Nova Teutonia, 1934 (*F. Plaumann*).

Comparative notes.—On account of the evenly convex pronotal disc this species can only be compared with *H. obscura* Sharp var. *plana* Hinton (MSS.) of Central Mexico. From *plana* it may be immediately separated by its smaller size. In my series of 1,208 specimens of *plana* the smallest specimen (very much smaller than the average, which is about 3.0 mm.) is 2.1 mm.

NOTES AND OBSERVATIONS.

GYNANDROUS ANTHOCHARIS CARDAMINES IN CO. TYRONE.—An interesting gynandrous example was captured on May 5th, 1935, near Stewartstown, close to the locality where three other intersexes have occurred. Left side male; right side female, but with two orange streaks, one along the costa and another just below, extending from the discoidal to the edge of the wing. The female portion on the underside has six orange streaks divided by the white ground-colour of the fore wing. When flying it resembled a worn and rubbed male. On May 17th we had a snow-storm, which wiped out all Lepidoptera, especially the butterflies, for a time.—THOMAS GREER; Sandholes, Dungannon, co. Tyrone.

LUPERINA DUMERILII, DUP. IN SUSSEX.—I took at light on September 10th, in Sussex, a *Noctua* which I did not know. Subsequently I found it agreed exactly with the figure of *Luperina dumerilii* in Seitz, *Pal. Noct.*, I, vol. iii, pl. 43, d. 1. In order to remove all doubt as to its identity I submitted the specimen to Mr. Tams, who kindly examined and determined it as being the species mentioned.—G. W. WYNN; The Old Cottage, Buxted, Sussex.

AN UNUSUAL AND BRIEF ABUNDANCE OF PHIBALAPTERYX FLUVIATA HÜB. IN CO. CORK.—I have received from my sister, Mrs. G. E. Lucas, since October 8th last 7 males and 16 females, a total of 23 specimens of *Phibalapteryx fluviana*, Hüb. (*obstipata*, Fab., *gemmata*, Hüb., ♀). The locality is Ummara, near Timoleague, co. Cork. On the 5th ult. 9 were secured along with a specimen of *Hypena obsitalis*, Hüb. (*vide Entom.*, 1936, p. 264). Between that date and 12th ult., 13, and lastly 1 on the 14th ult. Quoting from my sister's letter of the 13th of last month, she says: "There must have been a regular invasion of *P. fluviana* into this country, judging by the numbers we saw at Ivy, Michaelmas daisies and White Escalonia. I send 13 more of the moths to-day. The females vary a good deal." Previously this small geometer has been taken singly at Ummara and Tracton, near Kinsale, aggregating to 14 in all since 1908.—C. DONOVAN (Lt.-Col., I.M.S. [ret.]); Bourton-on-the-Water, Glos, November 5th, 1936.

NOTE ON SPILOMYIA (SYRPHIDAE).—Usually, when collecting insects, it is quite easy to tell whether one has a bee or a fly in the net by the sound made by the insects. But on August 25th I netted an insect on the margin of Lake Ajawaan, in Saskatchewan, and supposed that I had a wasp (*Vespula*), the sound being exactly as in these insects. To my surprise it was a fly, *Spilomyia quadrfasciata* Say. It is more slender than ordinary *Vespula*, and does not look much like a wasp, but there are other species of *Spilomyia*

which have the build and colour of a *Vespula*, the superficial resemblance being very close indeed. Presumably they all produce the same sound. Are we to suppose that the wasp-like sound was first produced, and then some of the species came to resemble wasps? It is a curious case, to be debated by the supporters and opponents of the theory of mimicry.—T. D. A. COCKERELL.

CATOCALA NUPTA L. IN NOTTINGHAMSHIRE.—This species was taken in two districts near Newark, about 5 miles apart, on September 13th, 1936. Six specimens were seen sitting on telegraph posts and I secured three of them; the others were so high as to be quite out of reach. I am also reliably informed that *nupta* was seen about the same date in the Southwell district. The only previous record for Nottinghamshire is the very doubtful one in Sterland's list of the Lepidoptera of Sherwood Forest.—E. V. HODSON; 49, Davies Road, West Bridgford, Nottingham.

INFLUX OF PLUSIA GAMMA AT WESTON-SUPER-MARE, AUGUST 25TH, 1936.—I was at Weston-super-Mare, Somerset, from August 22nd till September 5th. The first week I was on holiday; the second week I was in Bristol during the day, but returned to Weston-super-Mare in the evening. I did not observe *P. gamma* until the morning of August 25th, when I noted them in thousands on *Nepeta* and other flowers (including dwarf Dahlias) and rock plants in ornamental gardens on the sea front. They were also abundant on valerian near the Old Pier, and swarmed on *Buddleia* blossom and lavender in gardens of private houses near the sea front. They were in dense masses on every such flower from Old Pier to the end of the sea-front, a distance of about $1\frac{1}{2}$ miles. They were equally abundant on the miniature golf-courses a little further back from the sea-front. The weather from August 23rd to 26th inclusive was fine, very hot and scarcely any breeze. What wind there was came from an easterly direction—that is, a land breeze. I did not see the arrival of *P. gamma*. I do not think they arrived before August 25th, because I did not observe them at light on August 24th, whereas on the 25th they were flying round electric lights on the sea promenade and on the lighted band-stand in thousands. They were at their maximum on August 26th, when literally hundreds of the moths were observed on each small flower-bed. The hosts of moths vanished on August 27th—at least I only observed a few isolated specimens on that day, and thereafter during my stay at Weston-super-Mare. The weather changed on that day. The sky was overcast and the wind was south-west, strong. It continued to blow for two or three days, and then the weather became hot again with very little wind. August 29th was very hot, with weather conditions similar to the earlier part of the week, but *P. gamma* did not reappear. I did not observe the departure of the moths. My son, Peter M. H. Davis, who observed the phenomenon, actually caught about three dozen without using a net—that is by means of the usual glass-bottomed pill-boxes—in a

few minutes on one of the miniature golf-putting courses on August 25th. We did not examine the insects closely, but they were mostly in excellent condition, large and rather dark in colour. They seemed to be feeding continuously, and I only saw one or two resting on the foliage in their characteristic position. I did not observe that they were hawked by birds, but I did notice that several bats were flying round the electric lights on August 25th and 26th, though I did not actually observe a bat take a moth, or see any broken wings under lamps the following mornings. I have never seen such an amazing quantity of any species of Lepidoptera before; in view of the area over which they were spread, say a frontage of $1\frac{1}{2}$ miles, they must have been present in scores of thousands. As I have said, when observed in daytime they were ravenously feeding continuously. My wife as well as my son can confirm the above account.—MERVYN J. L. DAVIS; 8, Osborne Road, Clifton, Bristol, 8.

Correction.—*Entomologist*, 69: 229, line 17, for "Weston-super-Mare" read "Redland Green, Bristol".

ANOTHER NEPHOPTERYX SIMILELLA, Zk.—I, who know little of Lepidoptera, had no idea this Knot-horn was so rare as it is shown to be at p. 240, *supra*, though my single female, taken quite recently, was termed "a great rarity" by my friend, Mr. A. R. Hayward, of Misterton, when kindly naming it for me. Its capture happened upon a very festive night, July 14th, 1934, when there gathered around the powerful petrol-lamp of Mr. John L. Moore, of Gorleston, upon the historic Lobster-moth spot, above the declivity to the bog, in Denny Wood, New Forest, Sir Thomas and Lady Jackson, of Herringfleet, their son, and several other members of the Suffolk Naturalists' Society, Cmdr. Burt and one or two local collectors. It was one of those uncertain, warm and dry nights when luck is upon the knees of the gods, for no less than eight *Enistis quadra*, L., of both sexes came down and practically nothing else of note, excepting the present Phycitid and a male *Ophion bombycivorus*, Gr., the ichneumon of *Stauropus fagi*, L., both of which were attracted, not by the sheet-light, but by supplementary head-lights of one of our cars standing alongside. Mr. Tom Jackson swore he could see *Acherontia atropos*, L., flying over the main light; but, even by standing upon a piece of paper, his stalwart father failed to reach the prize. So we trundled off home at 1.45 (Lying Time).—CLAUDE MORLEY.

COELOSIA FLAVA STAEG. IN OXFORDSHIRE (DIPTERA, MYCETO-PHILIDAE).—When reviewing the British fungus-gnats in 1924 I was able to record only one British locality for *Coelosia flava* Staeg. Since then the species has been found in Yorkshire by Mr. C. A. Cheetham, but I met with it myself for the first time on July 4th, 1936, when I took a short series in a wood near Charlbury, Oxford. This wood was of rather a peculiar character, with many large and decaying elder-trees bearing an unusual quantity of Jew's-ear fungus. Possibly *C. flava* may be associated with this fungus.—F. W. EDWARDS.

INDEX.

GENERAL.

- Aberration of *Argynnis cydippe*, 254
 Aberrational influence? What is, 34
 Abnormal pairings, 70
Acherontia atropos at Skelmanthorpe, 44
Acropyga robae sp. nov. (Hym. Formicidae), a new S. American ant, 108
Agrotis cinerea occurring inland, 16
Amiota alboguttata Wahlb. in Dorset (Diptera, Drosophilidae), 218
Anopheles maculipennis Mg., probable occurrence in England of the so-called typical race, 242
Apatura iris in Surrey, 174
Aplasta ononaria in Kent, 107
Arctia caia in the autumn in Cornwall and Devon, 15
Argynnis paphia ab. *valesina* in Kent, 215
 Arrangement for preventing larvae from spinning their cocoons on top of the cocoons of others, 253
Asterope boisduvali at sea, 230
 Attempt to breed from *Lysandra coridon* Poda, var. *syngnatha* Keff., 77
 Braconidae, Notes on: XV.—Microgasterinae, 39, 64, 90, 115, 140, 160, 187, 209
 British Lepidoptera collecting, 1935, 104, 132, 157
Bucculatrix maritima Stt. 1st brood, 45
 Bulgarian *Rhopalocera*, June and July, 1933, 101, 136
 Butterflies from Siam, Notes upon some, with descriptions of new races and forms (Lep. *Rhopalocera*), 56
 Butterflies in North Lancashire, second brood *Erynnis tages*, 94
 Butterflies of St. Kitts, 274
 Caddis flies (Trichoptera), A handbook of British, 193
Callimorpha hera at Exeter, 218
Catocala fraxini at Eastbourne, 266
Catocala nupta ab. *brunnescens*, 45
Catocala nupta in Nottinghamshire, 291
Celerio galii Rott. in the Team Valley, North Durham, 60
 Ceratopogonids on wings of dragonflies, 192
 Ceratopogonine flies sucking Geometrid larvae, 192
Chionaspis asparagi, Laing and Cockerell, The type locality of, 156
Cimbex femorata in Croydon, 168
Coelosia flava Staeg in Oxfordshire (Diptera, Mycetophilidae), 29?
Colias croceus in the Isle of Man, 38; in North Wales, 1935, 153; in Wales, 215; at Eastbourne, 252
 Collecting near Starcross, A week's, 114
 Correction, 124, 242, 263, 268
Cosmophila sabulifera in Kent, 169
Danaus chrysippus at sea, 36
Danaus plexippus at Bexhill, 42; in South Cornwall, 94; in S. Devon, 230
Deiopeia pulchella and *Argynnis lathonia*, etc., at Eastbourne, 44
Dicranura bifida: late emergence, 266
 Diptera in Dumfriesshire, 18, 95
 Diptera (Phoridae), Two, new to the British List, 219
 Dryopidae, New, from the Japan Empire (Coleoptera), 164
Earias Hb. (Lep. Noctuidae), A new species of, 239
 Early dates for *Scoliopteryx libatrix*, 238
 Early emergence of *Scoliopteryx libatrix*, 199
 Empididae at Chedworth, Glos, 219
Enargia ulicis (Lep. Noctuidae) at Brockenhurst, 224
 Ephestia larvae eating dead larvae of their own species, 159

- Erioptera riedeli* Lackschewitz in Scotland: An addition to the British Tipulid fauna, 219
Eucosma brunnichiana, L., 208
Eucosma solandriana, Southern forms of, 217
Eupista (Coleophora) *sylvaticella* Wood, and *Lithocolletis distentella* Zell., in East Kent, 114
Euproctis chrysorrhoea in Essex, 156
 Food-plant, A curious, for *Pyrrhia umbra*, 177
 Food-plant of *Tyria jacobaeae*, 217, 240, 254
 Food-plant, Unusual, of *Sesia cynipiformis*, 16
Gerris najas single or double-brooded? 46
Gonepteryx rhamni in December, 43; in November, 14, 43, 69; a note on the larva, 85, 111
Graphiphora plecta, Does, migrate? 242
 Great frost of May, 1935, and its effect on butterfly life, 54
 Gynandromorphous specimens of *Argynnis paphia* Linn. (1758), A list of British, 173, 222
 Gynandrous *Anthocharis cardamines* in co. Tyrone, 290
Hadena satura at Wicken, 131
Hebrides, Notes from the, 71
Herse convolvuli (Linn.) at 10,000 ft., 224
Heterocera attacking *Cotoneaster horizontalis* and *microphylla*, 144
 Hibernating, *Vanessa atalanta*, in Yorkshire, 53
Hippotion celerio in Surrey, 15
Hyloicus pinastri in the New Forest, 177
Hylophila bicolorana in Worcestershire, 230
Hypera obsitalis Hub., The Deltoid, in Ireland, 264
Hyponomeuta rorella Hb. seriously damaging willows in Suffolk, 217, 269
Ilisia (Diptera, Tipulidae), The British species of, 218
 Immigrant Lepidoptera in Outer Hebrides, 1936, 265
 Immigration, Observed, of butterflies at Studland Bay, Dorset, 168
 Inverted male hypopygia in *Erioptera* crane-flies, 243
Lampropteryx otregiata Metcalfe, The life-history of, 245
Larentia ocellata larvae and *Aglais urticae* unaffected by frost, 94
 Lasiocampidae belonging to the genus *Pachypasa* Walker, 1855, A new species of, 160
 Late appearance of *P. brassicae* larvae, 6, 63
 Late brood of *Pieris brassicae* larvae, An unusually, 44
 Leaf-cutter bee, An unusual nest of, 18
 Lepidoptera collected during 1935, Notes on, 197
 Lepidoptera in West Cornwall, 17; at Norwood, 32; of Cara Island, 49
Libellula depressa in Yorkshire, 186
Limnitis camilla, 238; in Lincolnshire, 263
Limnitis camilla ab. *nigrina*, 33
Lipopteryx torrana Pierce, 242
 LOCAL LISTS AND RECORDS :
 A. *British*.
 Bexhill, 42
 Cara Island, 49
 Cork, 290
 Cornwall, 94, 181
 Derbyshire, 42
 Devon, 230, 252
 Dorset, 94, 218
 Dumfries, 18, 95, 266
 Durham, 60
 Eastbourne, 44, 266
 Essex, 55, 156
 Glos, 219
 Hants, 181, 219, 224
 Hebrides, 71, 265
 Ireland, 80, 264
 Isle of Man, 38
 Kent, 17, 107, 114, 168, 169, 215, 230
 Lincolnshire, 263
 New Forest, 177
 Norfolk, 131, 230, 269
 Norwood, 32
 Nottinghamshire, 291
 Oxon, 292
 Scotland, 219
 Somerset, 219
 Staffs, 191, 216
 Suffolk, 215, 265, 269
 Surrey, 15, 174
 Sussex, 290
 Wales, 215
 Wilts, 181
 Worcs, 230
 Yorks, 186
 B. *Foreign*.
 Bulgaria, 101, 136
 St. Kitts, 274
 Tobago, 200

- Loxostege palealis*, 16
Luperina dumerilii Dup. in Sussex, 290
Lymantriidae, New African, 178
- Macroglossum stellatarum* in October, 15; at Hastings, 208; taking a sea passage in a steamer, 143
Macrolepidoptera of Ireland, 80
Mania maura in sand martin's nests, 12
Maniola jurtina (L.) in N.E. Derbyshire, 43
Melanargia (Lep. Satyridae), Notes on the distribution of the European species of the genus, 231, 260, 263, 264
Midges attacking caterpillars, 192
Migrant *Plusia gamma* at nearly 10,000 ft. caught in a storm?, 241
Migrating insects, British Isles, 1931-1935, The collection and analysis of records of, 125
Migration records, 1935, 1; 1936, 154, 182, 225, 255
Migration, *Vanessa cardui*, in United States, 1935, 169
Mimas tiliae in Staffordshire, 191, 216
Misella oxyacanthae var. *capucina*, 53
Myelois neophanes (Lep. Pyralidae), Note on the biology of, 223
- Nash collection, The, 120
Nephopteryx similella Zinck., 240; another, 292
New Brazilian *Dryopidae* (Coleoptera), Descriptions and figures of, 283
New forms of *Papilio* from the Indo-Australian region, 281
New Kashmir Caddis fly (Trichoptera), A, 13
New species, A, of *Danaidae* (Lep. Rhopalocera), and other new butterflies, 112
Nymphalis antiopa, Liberation of, in England, 67; hibernating in Cornwall, 69; in Derbyshire, 42; in Wilts, 181; in Suffolk, 215; in Norfolk, 230
Nymphalis polychloros in Cornwall and Hants, 181
- OBITUARY:
Gestro, R., 196
Lackschewitz, P., 195
Sharp, Edwin P., 244
- Odonata in Kent, 17
Odonata, Notes on British, in 1934 and 1935, 149
Oenestis quadra L., Is it a migrant, 282
- Pairing of *Volucella bombylans*, 242
Papilio machaon in Kent, 168
- Parasites, A list of *Lepidoptera* from which, are particularly desired, 81
Phibalapteryx fluviala Hüb. in co. Cork, An unusual and brief abundance of, 290
Pieris manni Mayer, Autumn form, at Menton, 216
Plusia gamma at Hastings, 12, 45; in quantity, 241; in numbers dead in snow at 10,000 ft., 266; at nearly 10,000 ft. caught in a storm?, 241; influx of, at Weston-super-Mare, August 25th, 1936, 291
Plusia interrogationis unusually abundant, 192
Polygonia c-album in 1935, Records of, 139; colour scheme of, 191; Notes on, 215; in N. Devon, 252
Pontia daplidice in Essex, 55
Psyllidae, Observations on the biology of certain British, 175
Pupation of *Asteroscopus nubeculosa*, 278
Pyrgus alveus in Norfolk, 131
- Rare gall in Kent, 230
- RECENT LITERATURE:
Applied Entomology, 169
Blatt-minen Mittel- und Nord-Europas, 21
Biology of Mayflies, 193
Biological Processes in Tropical Soils, 98
Catalogue of the *Macrolepidoptera* of Ireland, 123
Clothes Moth pamphlet, 72
Colorado Beetles at Tilbury: III, 98
Eton College, Natural History Society: Annual Report, 84
Hymenopterorum Catalogus, 147
Immigrant Butterflies and Moths, 72
Insects of Samoa, 72
Locust Outbreak in Africa and Western Asia in 1934, 97
London Naturalist, 1934, 84
Malvern College Natural History Society, 99
Monograph of the British Neuroptera, 146
Monograph of the genus *Erebia*, 144
Mosquitoes of the Ethiopian Region, 170
Proceedings of the South London Entomological Society, 96
Public School Explorers in Newfoundland, 98
The Wasp, 20
Transactions of the Suffolk Naturalists' Society, 73
Transactions of the Society for British Entomology, 86

- United States Department of Agriculture: Technical Bulletins, Circulars, etc., 73
Rhithrogena semicolorata Curtis and *R. semitincta* Pictet (Ephemeroptera), 279
- Sawfly Terebrae, The mechanism and manner of action of the, 25
 Second brood *Erynnis tages*, 94, 119, 131, 159, 262; of *Argynnis selene*, 222
Sesia myopaeformis feeding in *Craetagus oxyacantha*, 60
Sesia tipuliformis Clerck in Dumfriesshire, 266
- SOCIETIES:
 Entomological Club, 24, 75, 100, 172, 195, 268
 Entomological Section, Birmingham Natural History Society, 24, 76, 100
 Royal Entomological Society of London, 47, 73, 99
 South London Entomological and Natural History Society, 22, 48, 124, 148, 171, 194, 220, 243, 267
 Some African Osmiine bees, 37
Sphinx convolvuli in Sussex, 14; in Dorset, 290
Spilomyia (Syrphidae), Note on, 290
Strymon w-album attracted to cow parsnips, 31
 Symmetry in the wing-pattern of some Papilionid butterflies, 7
- Thaumetopoea pityocampa* (Lep.), Swarming of, 15
- Thecla quercus* congregating at Hawthorn, 14
 Tobago and its butterflies, 200, 240
 Trichoptera, British, Some records of, in 1933, 87
 Trichoptera, imaginal, apparently feeding, 63
 Trichoptera in the Austrian Tyrol, 119
 Trigona in the Caroline Islands, 17
- Vanessa antiopa*, An old record of, 143
Vanessa atalanta ab. *fracta* Tutt in the South of France, 181, 273
Vanessa atalanta hibernating in Yorkshire, 53; in March, 94; in April, 131
Vanessa atalanta, "marking", 263
Vanessa cardui in January, 63; at sea, 43
Vanessa cardui and *Polygonia c-album* in West Cornwall, 273
 Vanessids in South Ireland, 263
 Varieties, Some, of British Lepidoptera, 221
Volucella bombylans, Pairing of, 242
- Wicken Fen Fund, 111
- Yellow *Pieris napi*: A breeding experiment, 61
- Zygaena achilleae* and *Z. filipendulae* in the Western Highlands, Further notes on, 271
Zygaena lonicerae larvae feeding on Pennywort, 186

SPECIAL INDEX.

New Names are marked with an asterisk.

Order VIII. ORTHOPTERA.

- | | |
|------------------------------|---------------------------------|
| graminis (Thesprotea), 48 | migratorius (Locusta), 24 |
| gregaria (Schistocerca), 97 | parallelus (Stenobothrus), 171 |
| migratoria (Locusta), 97 | pardalina (Locusta), 97 |
| migratorioides (Locusta), 97 | septemfasciata (Nomadacris), 97 |

Order XII. ISOPTERA.

- curvignathus (Coptotermes), 98

Order XIV. EPHEMEROPTERA.

- | | |
|---------------------------------|-------------------------------|
| fluctuans (Callibaetis), 194 | semitincta (Rhithrogena), 279 |
| semicolorata (Rhithrogena), 279 | vulgata (Ephemera), 194 |

Order XV. ODONATA.

- | | |
|------------------------------------|------------------------------------|
| aenea (Cordulia), 153 | mercuriale (Coenagrion), 149 |
| Aeshna, 256 | meridionale (Agrion), 149 |
| boltoni (Cordulegaster), 149 | metallica (Somatochlora), 153 |
| cancellatum (Orthetrum), 17 | mixta (Aeshna), 5, 153 |
| coerulescens (Orthetrum), 153 | nymphula (Pyrrhosoma), 150 |
| cyanea (Aeshna), 70 | pennipes (Platycnemis), 151 |
| cyathigerum (Enallagma), 149 | pratense (Brachytron), 153 |
| danae (Sympetrum), 153 | puella (Coenagrion), 152 |
| depressa (Libellula), 153, 186 | pulchellum (Agrion), 244 |
| dryas (Lestes), 149 | pulchellum (Coenagrion), 149 |
| elegans (Ischnura), 149 | quadrimaculata (Libellula), 5, 153 |
| fulva (Libellula), 18 | rufescens (Ischnura), 151 |
| grandis (Aeshna), 150, 259 | splendens (Agrion), 149 |
| imperator (Anax), 151 | sponsa (Lestes), 150 |
| infuscans (Ischnura), 151 | striolatum (Sympetrum), 5, 153 |
| infuscans-obsolata (Ischnura), 152 | virgo (Agrion), 149 |
| junceae (Aeshna), 70, 149 | |

Order XVII. HEMIPTERA.

- | | |
|-----------------------------|------------------------------|
| albi (Psylla), 176 | cornutus (centrotus), 23 |
| asparagi (Chionaspis), 156 | discrepans (Psyllopsis), 176 |
| atriplicis (Trioza), 176 | dudai (Psylla), 177 |
| aurita (Ledra), 48 | duplex (Aspidiotus), 73 |
| brunneipennis (Psylla), 177 | ericae (Aphalaroida), 176 |
| buxi (Psylla), 176 | försteri (Psylla), 176 |
| cataphracta (Orthezia), 72 | fraxini (Psyllopsis), 176 |
| chenopodii (Trioza), 176 | genistae (Gargara), 23 |

hemisphaericum (Lecanium), 47
 juncorum (Livia), 176
 klapaleki (Psylla), 177
 maculata (Notonecta), 86
 mali (Psylla), 175
 montana (Cicadetta), 244
 najas (Gerris), 46
 nigrita (Psylla), 175
 personatus (Reduvius), 23
 peregrina (Psylla), 175

pyricola (Psylla), 175
 rhamnicola (Psylla), 177
 salicicola (Psylla), 177
 salicis (Chionaspis), 72
 sorbi (Psylla), 176
 subferruginea (Psylla), 175
 urticae (Trioxa), 176
 viridissima (Psylla), 176
 walkeri (Trichopsylla), 176

Order XIX. NEUROPTERA.

psociformis (Conwentzia), 243

roseipennis (Myrmeleon), 48

Order XX. TRICHOPTERA.

albicorne (Odontocerum), 88
 albicornis (Mystacides), 88
 alpestris (Stenophylax), 87
 angustipennis (Hydropsyche), 88
 auricula (Limnophilus), 88
 azurea (Mystacides), 87
 biguttatus (Potamorites), 120
 centralis (Limnophilus), 88
 chrysotus (Drusus), 120
 ciliaris (Notidobia), 88
 clathrata (Neuronia), 87
 coenosus (Asynarchus), 88, 120
 discolor (Drusus), 120
 dorsalis (Rhyacophila), 89
 falcata (Oxyethira), 89
 felix (Diplectrona), 88
 femoralis (Hydroptila), 89
 flavicornis (Limnophilus), 87
 flavomaculatus (Polycentropus), 89
 forcipata (Hydroptila), 89
 fuscipes (Agapetus), 89
 hirtum (Lepidostoma), 88
 incisus (Colpotaulius), 87
 instabilis (Hydropsyche), 88
 longicornis (Mystacides), 88

ludificatus (Philopotamus), 120
 melanchactes (Drusus), 119, 120
 *mitchelli (Stenophylina), 13
 montanus (Philopotamus), 87
 nebulicola (Cryptothryx), 120
 nigrorectus (Drusus), 63
 nigronevrosus (Leptocerus), 88
 occipitalis (Wormaldia), 89
 occulta (Hydroptila), 89
 pellucidus (Glyphotaelius), 87
 phacopa (Lype), 89
 pilosa (Goëra), 88
 Pseudostenophylax, 13
 pusilla (Psychomyia), 89
 ruficus (Neuronia), 87
 sparsa (Hydroptila), 89
 sparsus (Limnophilus), 88
 stellatus (Stenophylax), 88
 stigma (Limnophilus), 88
 striata (Phryganea), 87
 subnigra (Wormaldia), 87
 subnubilus (Brachycentrus), 88
 vittatus (Limnophilus), 88
 waeneri (Tinodes), 88

Order XXI. LEPIDOPTERA.

abbreviata (Eupithecia), 82
 abietaria (Boarmia), 106, 133, 135
 abietella (Diorycetria), 83
 abjecta (Hama), 133
 abruptaria (Hemerophila), 253
 absinthiata (Eupithaëcia), 52
 absinthii (Cucullia), 267
 acaciae (Strymon), 138
 acanthodactyla (Platyptilia), 141
 achata (Ancyliis), 144
 achilleae (Zygæna), 48, 122, 271
 achilles (Morpho), 204
 acis (Thecla), 277
 actæon (Thymelicus), 139
 acteon (Adopoea), 133
 adippe (Argynnis), 23, 120
 admetus (Agrodiaetus), 103, 138

adonia (Euthalia), 56
 adscitella (Elachista), 116
 adusta (Hadena), 17, 107, 131
 adenaria (Cephus), 220
 aceria (Pararge), 55, 69, 106, 136
 aemulana (Eucosma), 84, 199
 aerolana (Lipopteryx), 242
 aestivaria (Hemiteia), 80, 82
 aethiops (Erebia), 102, 135, 136
 affinitana (Phalonia), 198
 agarithe (Phoebis), 206
 agatha (Neptis), 70
 agathina (Agrotis), 105, 135
 agestis (Aricia), 81, 121, 123, 138
 aglaia (Argynnis), 17, 70, 76, 12
 133, 134, 137, 221, 222
 agna (Charaxes), 57

- albipuncta (Leucania), 157
 albidorsana (Eucosma), 217
 albula (Terias), 206
 albulata (Emmelesia), 273
 alburnella (Telphusa), 22
 alceae (Carcharodus), 138
 aleiphron (Lycaena), 138
 alebion (Papilio), 8
 alexis (Glaucopsyche), 138
 alexis (Lycaena), 142
 aliphera (Eueides), 203
 allica (Zemeros), 58
 alni (Acronycta), 107
 alniaria (Ennomos), 2, 32
 alnifoliella (Lithocolletis), 118
 altheae (Carcharodus), 138
 alveus (Pyrgus), 131, 138
 amalthaea (Anartia), 203
 amandus (Polyommatus), 138
 ambigua (Caradrina), 34, 114, 143, 157
 aminias (Eudamus), 207
 ammon (Hemiargus), 277
 amyntas (Acolastus), 278
 amyotella (Lithocolletis), 83, 114
 andalusica (Dianthoeia), 123
 androgeus (Papilio), 202, 206
 andromeda (Taygetes), 204
 angerona (Strymon), 277
 angustella (Alispa), 198
 annulata (Cosymbia, Ephyra), 82
 annulatella (Coleophora), 199
 anomala (Stilbia), 135
 anteros (Aricia), 101, 138
 anthyllidella (Stomopteryx), 33, 84
 antico-obsoleta (Lysandra), 122
 *antillarum (Terias), 275
 antimache (Prepona), 203
 antimachus (Papilio), 113
 antiopa (Nymphalis), 5, 42, 50, 67, 69, 137, 156, 181, 259
 antiopa (Vanessa), 143
 antoninus (Thracides), 208
 aphirape (Argynnis), 103, 137
 apiciaria (Epione), 135
 apicipunctella (Elachista), 33
 apiformis (Aegeria, Trochilium), 220
 apollinus (Doritis), 244
 apollo (Parnassius), 103
 aprilina (Agriopis), 158
 arbusculae (Eriogaster), 116
 arcana (Coenonympha), 136
 ardeipenella (Coleophora), 83
 arete (Aphantopus), 120
 arge (Agapetes, Melanargia), 231
 argiolus (Celastrina), 138
 argiolus (Cyaniris), 80
 argiolus (Lycaenopsis), 69, 106, 267
 argus (Plebejus), 17, 123, 134, 138, 174
 argyrognomon (Lycaeides), 138
 arion (Lycaena), 171
 arion (Maculinea), 121, 138
 armoricana (Pyrgus), 138
 artaxerxes (Aricia), 121
 arundineta (Nonagria), 135
 arundinis (Macrogaster), 92
 ashworthii (Noctua), 105
 asopo (Pteronymia), 203
 assimilata (Eupithecia), 82
 asteris (Cucullia), 23, 135
 astrarche (Aricia), 138
 astrarche (Lycaena), 81
 atalanta (Vanessa), 1, 17, 49, 53, 54, 69, 84, 94, 95, 126, 131, 137, 154, 158, 168, 181, 183, 211, 227, 252, 255, 263, 266, 273
 athalia (Melitaea), 84, 103, 118, 137
 athalia (Terias), 206
 atomaria (Ematurga), 17
 atomella (Depressaria), 199
 atra (Chrysoclista), 33
 atropos (Acherontia), 3, 44, 122, 292
 aurago (Xanthia), 158
 aurelia (Melitaea), 137
 aurella (Nepticula), 40
 aurinia (Euphydryas), 17, 47, 105
 aurinia (Melitaea), 93, 116
 aurolimbata (Orgyia), 187
 australis (Aporophylla), 158
 aversata (Ptychopoda), 23, 171
 bahula (Pantoporia), 57
 balcanica (Colias), 136
 baja (Noctua), 134
 barretti (Dianthoeia), 122, 123, 157
 basiguttella (Nepticula), 40
 baumaniana (Chlidonia), 197
 beata (Euthalia), 56
 beatricella (Lozopera), 198
 belgaria (Scodionia), 105
 belia (Euchloe), 103
 bellargus (Lysandra), 35, 77, 121, 135, 138, 157
 bellargus (Polyommatus), 23
 bennetii (Agdistis), 23
 beon (Calycopis), 205
 bergmanniana (Argyrotoxa), 84
 bessus (Pellicia), 207
 betulae (Ornix), 118
 betulae (Thecla), 197
 betularia (Amphidasys), 72, 117, 140
 betularia (Pachys), 106, 107
 betulicola (Nepticula), 40
 biblis (Didonia), 203, 277
 bicolorana (Hylophila), 106, 230
 bicolorata (Mesoleuca), 135
 bicolorata (Plemmyria), 32
 bicoloria (Leucodontia), 123
 bidentata (Gonodontis), 72
 bidentata (Odontopera), 124
 bifida (Cerura), 106
 bifida (Dicranura), 266
 bilineata (Camptogramma), 52
 bilunana (Eucosma), 33
 bilunaria (Selenia), 71, 82
 bipuncta (Cosmophila), 169, 171

- bipunctarius (Melissoblastes), 267
 bistrigula (Rhithon), 207
 blanchardella (Lithocolletis), 83
 blandiata (Emmelesia), 273
 boisduvali (Asterope), 230
 boscana (Peronea), 199
 brachydactylus (Pselophorus), 118
 brassicae (Pieris), 2, 6, 39, 44, 50, 63,
 69, 85, 95, 103, 115, 154, 186, 225,
 255, 263, 266
 braziliensis (Caligo), 204
 brevilinea (Noctua), 92
 brevilinea (Nonagria), 71
 brizella (Aristotelia), 198
 brumata (Cheimatobia, Operophtera),
 6, 82
 brunnaeana (Eucosma), 217
 brunnea (Noctua), 107
 brunnescens (Catocala), 45
 brunnichana (Eucosma), 208, 217, 242
 bubastus (Callicista), 205
 bubastus (Thecla), 277
 cactorum (Cactoblastis), 148
 caeneos (Emesia), 205
 caeruleocephala (Diloba), 80, 82, 141,
 161
 caesiata (Larentia), 135
 caesiella (Swammerdamia), 141
 caia (Arctia), 15, 51, 71, 75, 116, 259
 *calamolopha (Paraproctis), 178
 c-album (Polygonia), 34, 44, 54, 69,
 70, 123, 132, 137, 139, 191, 198,
 215, 222, 252, 262, 273
 caliginosa (Acosmetia), 267
 calus (Calycopis), 205
 calyce (Nymphidium), 205
 camelina (Lophopteryx), 83, 134
 camilla (Limenitis), 33, 34, 44, 69,
 120, 124, 132, 197, 238, 262, 263
 cana (Cystineura), 203
 caniola (Lithosia), 143, 157
 canus (Calycopis), 206
 capsicola (Dianthocia), 17, 48, 188
 capsicola (Harmodia), 197
 capucina (Miselia), 53
 cardamines (Anthocharis), 69, 70, 102,
 136
 cardamines (Euchloe), 290
 cardui (Vanessa), 1, 17, 43, 44, 49, 54,
 63, 69, 95, 126, 137, 143, 154, 157,
 168, 169, 183, 203, 227, 252, 255,
 263, 266, 273
 carmelita (Lophopteryx), 105
 carphodactylus (Pterophorus), 198
 carpinata (Lobophora), 105
 carpophaga (Dianthocia), 48, 172
 carpophaga (Harmodia), 197
 carthami (Pyrgus), 138
 cassius (Leptotes), 205
 castanea (Noctua), 157
 castaneae (Macrogaster), 106
 castaneae (Phragmatoecia), 92
 castigata (Eupithecia), 117
 castrensis (Malacosoma), 133
 cataleuca (Agapetes, Melanargia), 261
 catillus (Eudamus), 207
 cautella (Ephesia), 159
 ceeropia (Attacus), 71
 celorio (Hippotion, Chaerocampa), 15
 centaureata (Eupithecia), 267
 cerisyi (Zerynthia), 103
 cerysi (Thais), 10
 cespitis (Tholera), 143, 147
 ceto (Erebia), 103, 136
 chaerophylla (Epermia), 141
 chaerophylla (Epermenia), 199
 chamomillae (Cucullia), 105
 chaonia (Drymonia), 105
 charithonia (Heliconius), 274, 276
 childrenae (Argynnis), 76
 chiriquensis (Rhithon), 207
 chiron (Aricia), 138
 chlorana (Earias), 32, 239
 chloridice (Synchlœ), 101
 chlorocoma (Colias), 76
 chlorophyllana (Earias), 239
 *christopheranus (Papilio), 274
 chrysippus (Danaus), 36, 47
 chrysodona (Colias), 75
 chrysorrhoea (Euproctis), 156
 chrysorrhoea (Porthesia), 209
 chrysothemiformis (Colias), 120
 ciliella (Phalonia), 84
 cinerea (Agrotis), 16, 171
 cinnus (Lysandra), 79
 cinxia (Melitaea), 92, 118, 120, 137
 circe (Anulocera), 136
 citrana (Eucosma), 198
 citrata (Dysstroma), 24
 citrona (Pieris), 61
 clathrata (Chiasmia), 24
 clathrata (Semiethia), 199
 cleantho (Agapetes, Melanargia), 260,
 264
 cleodoxa (Argynnis), 137
 cleopatra (Gonepteryx), 186
 clotho (Agapetes, Melanargia), 261
 c-nigrum (Noctua), 71
 *cofea (Papilio), 113
 cognatellus (Hyponomeuta), 269
 combusta (Xylophasia), 272
 comes (Triphaena), 72, 134
 comma (Hesperia), 135, 197
 complana (Lithosia), 135
 concinnata (Dysstroma), 24
 confusalis (Nola), 80
 conjugella (Argyresthia), 213
 consociella (Acrobasis), 83
 consonaria (Boarmia), 106
 consortaria (Boarmia), 23, 172
 conspersa (Dianthocia), 48
 contaminellus (Crambus), 24, 32
 contigua (Hadena), 272
 contigua (Mamestra), 17, 107
 convolvuli (Herse), 4, 122, 184, 224,
 258

- convolvuli (Sphinx), 14, 94
 corades (Callimormus), 208
 cordula (Satyrus), 103, 136
 coridon (Lysandra), 35, 77, 120, 135, 138
 coridon (Polyommatus), 23
 coronata (Thecla), 194, 220
 cortica (Megistias), 207
 corticalis (Hypotia), 209
 corticea (Agrotis), 17
 corticella (Tinea), 199
 corydon (Lysandra), 134
 corydon (Perichares), 208
 corydonis (Lysandra), 121
 corylata (Cidaria), 106
 coryli (Demas), 134
 costella (Phthorimaea), 33
 costipuncta (Hypena), 265
 cotoneastri (Cremona), 144
 cotoneastri (Depressaria), 144
 craccae (Toxocampa), 162
 crataegi (Aphoria), 103
 crataegi (Eriogaster), 197
 cristana (Peronea), 199
 crocealis (Pionea), 83
 croceus (Colias), 1, 17, 34, 38, 44, 69, 75, 95, 120, 126, 136, 153, 155, 157, 168, 183, 215, 225, 252, 255, 263, 265
 crolus (Tmolus), 205
 cucubali (Dianthaecia), 188
 cuculata (Euphyia), 23
 cuculatella (Nola), 118
 cuculla (Lophopteryx), 157
 cucullata (Anticlea), 118, 161
 culiciformis (Aegeria), 123
 cursoria (Agrotis), 134, 171
 curtisii (Triphaena), 134
 curtula (Pygacra), 220
 cydippe (Argynnis), 70, 95, 120, 133, 137, 254
 cyllarus (Glaucopsyche), 138
 cynipiformis (Sesia), 16
 cyphara (Calycopis), 206
 czekeii (Lysandra), 121
 dahlia (Noctua), 134
 daira (Terias), 275
 *dannatti (Danaus), 112
 daphne (Argynnis), 137
 daplidice (Pontia), 5, 55, 103
 *davidsoni (Spindasis), 59
 davus (Coenonympha), 120
 dealbata (Scoria), 106
 decolorata (Everes), 101, 138
 defoliaria (Erannis), 82, 172
 defoliaria (Himera), 159
 defoliaria (Hybernica), 82, 91
 degeneraria (Acidalia), 134
 dejeani (Pyrameis), 112
 demodice (Prepona), 202
 desplana (Lithosia), 106, 135
 desfontainii (Euphydryas), 47
 dia (Argynnis), 137
 diamina (Melitaea), 137
 dictaea (Pheosia), 23
 dictaeoides (Pheosia), 83, 105, 107
 dictynna (Melitaea), 137
 didyma (Melitaea), 137
 diluta (Cleophana), 75
 diluta (Palimpsestis), 158
 dilutata (Oporinia), 82
 dilutaria (Ptychopoda), 32
 dimera (Colias), 194
 discipilota (Euthalia), 56
 discoidalis (Lysandra), 79
 discreta (Plebejus), 134
 dispar (Lycaena), 102, 121
 dispar (Lymantria), 82
 dissoluta (Nonagria), 123
 distentella (Lithocolletis), 114
 dispar (Lycaena), 138
 dodoneata (Eupithecia), 243
 dominicana (Colaenis), 276
 dominula (Callimorpha), 104
 dorilis (Lycaena), 138
 dorippus (Danaus), 36
 dromedarius (Notodonta), 83, 107, 118, 134
 drusilla (Appias), 275
 drymo (Ithomia), 203
 dumerilli (Luperina), 290
 duplaris (Cymatophora), 115
 duplaris (Palimpsestis), 132
 duponcheli (Leptidea), 136
 duponcheli (Leptosia), 102
 echo (Taygetes), 204
 edusa (Colias), 38, 85, 120
 elaeochroa (Dasychira), 180
 elathea (Terias), 206, 275
 elinguaris (Crocallis), 114
 elinguaris (Gonodontis), 32
 elpenor (Eumorpha), 244
 elpenor (Chaerocampa), 241
 emutaria (Acidalia), 124
 *eos (Papilio), 281
 ephippella (Argyresthia), 33, 71
 epiberus (Megistias), 207
 epiphron (Erebia), 101, 132, 136
 erate (Colias), 75
 erato (Heliconius), 203
 ericetaria (Selidosema), 134
 erigerella (Coleophora), 267
 eris (Argynnis), 137
 eroides (Polyommatus), 138
 erosa (Systacea), 207
 erosaria (Ennomos), 220
 ethlius (Calpodis), 207, 278
 eubule (Catopsilia), 206, 275
 eugenia (Morpho), 76
 eumedon (Aricia), 138
 euphorbiae (Celerio), 83, 185, 259
 euphrosyne (Argynnis), 106, 137
 euphrosyne (Brenthis), 172, 194
 euryades (Heliconius), 203
 euryale (Erebia), 102, 136
 eurycles (Eudamus), 207

- evonymella (Hyponomeuta), 83
 excelsa (Lysandra), 79
 exclamationis (Agrotis), 2, 17, 171
 exigua (Caradrina), 143
 expallidata (Eupithecia), 82
 extensaria (Eupithecia), 267
 exulans (Zygacna), 272
 fagaria (Scodionia), 105
 fagi (Hipparchia), 136
 fagi (Stauropus), 107, 142, 244,
 292
 fantasos (Carystus), 208
 fascelina (Dasychira), 105
 fasciana (Hapalotis), 107
 fasciella (Nemotois), 198
 fasciuncula (Miana), 51
 faunalis (Callicista), 205
 favicolor (Leucania), 133
 ferrugalis (Hapalia), 258
 ferruginella (Monopis), 33
 festucae (Plusia), 80, 132
 filipendulae (Zygaena), 83, 116, 271
 fimbria (Triphacna), 161, 171
 fimbriana (Pammene), 197
 fissipuncta (Orthosia), 32
 flammea (Meliana), 106
 flammealis (Endotricha), 33
 flava (Adopoea), 23, 148
 flava (Pieris), 62
 flavescens (Stracena), 178
 flavescens (Xanthia), 267
 flaviventris (Aegeria), 199
 forficalis (Pionea), 83
 fowleri (Lysandra), 121
 flavidorsana (Hemimene), 33
 flaviventris (Aegeria), 267
 fluctuosa (Palimpsestis), 107
 fluviata (Phibalapteryx), 264, 290
 formosa (Salebria), 32
 fracta (Vanessa), 181, 273
 fraxini (Catocala), 5, 48, 266
 fredericus (Achlyodes), 207
 frequentella (Scoparia), 33
 fritillarius (Carcharodus), 138
 fuciformis (Hemaris), 141
 fuliginosa (Phragmatobia, Spilosoma),
 82
 fuliginosa (Spilosoma), 71, 162
 fulvago (Xanthia), 23
 furcula (Cerura), 199
 fuscus (Papilio), 281
 fuscadinella (Coleophora), 83
 fuscescens (Borkhausenia), 33
 fuciformis (Hemaris), 106, 123
 fulvago (Xanthia), 267
 fulvata (Cidaria), 107
 fuscoaenea (Butalis), 83
 fuscobulbosa (Hepialus), 52
 fuscovenosa (Ptychopoda), 32
 galatea (Satyrus), 134
 galathea (Agapetes, Melanargia), 69,
 133, 136, 222, 231, 260, 263, 264
 galiata (Xanthorhoe), 17
 galii (Celerio), 5, 60, 122, 185
 gamma (Plusia), 2, 12, 45, 54, 154,
 182, 208, 225, 241, 252, 255, 263,
 266, 267, 291
 gemina (Apamea), 51, 107
 geminipuncta (Nonagria), 92, 123
 gemma (Catia), 278
 gemmata (Phibalapteryx), 290
 genistae (Mamestra), 106
 genoveva (Precis), 203, 276
 gesta (Chiomara, Niconides), 207
 gilvago (Orthosia), 197
 gilvaria (Aspilotes), 135
 glauca (Cilix), 80
 gleichenella (Elachista), 161
 gnoma (Pheosia), 83
 gonostigma (Orgyia), 23
 gothica (Monima), 71
 gothica (Taeniocampa), 104
 gothicina (Taeniocampa), 104
 gracilis (Taeniocampa), 93, 104
 graeca (Argynnis), 102, 137
 graminis (Ceraapteryx), 71
 graminis (Characas), 143, 187
 griseana (Eucosma), 217
 griseata (Lithostegia), 106
 griseola (Lithosia), 114, 133
 grossulariata (Abraxas), 23, 39, 72,
 94, 115, 194
 hamana (Euxanthia), 33
 hanno (Chilades), 205
 hanno (Hemiargus), 277
 hastata (Eulype), 272
 hastata (Melanippe), 115
 hastiana (Peronea), 199
 hecate (Argynnis), 137
 helice (Colias), 3, 34, 44, 75, 120,
 157, 184, 215, 256
 helios (Hypermnestra), 8
 hellmanni (Tapinostola), 135
 helvetica (Melitaea), 140
 helveticata (Eupithecia), 91
 helvola (Amathes), 158
 heparana (Pandemis), 84
 hera (Callimorpha), 23, 48, 114, 171,
 218, 267
 herncliana (Depressaria), 72
 hercyniana (Argyroplece), 84
 hermes (Euptychia), 204
 hermione (Hipparchia), 136
 herodotus (Calycopis), 206
 hesione (Euptychia), 204
 hesperitis (Calycopis), 205
 heterodactylus (Oxyptilus), 197
 hiarbas (Eurytela), 70
 hiendlmayrii (Aphaeus), 59
 hiera (Papilio), 281
 hippocastanaria (Pachynemata), 114
 hippothoe (Lycena), 138
 hispidaria (Apoclema), 104
 hispidaria (Nyssia), 71
 hispidus (Heliophobus), 158
 hortuellus (Crambus), 33

- hospita (Parasemia), 132
 humiliata (Sternha), 23
 hyale (Colias), 3, 44, 69, 136, 156, 157, 221, 225, 253
 hydara (Heliconius), 203
 hyerana (Hastula), 209
 hyperanthus (Aphantopus), 70, 120
 hyperantus (Aphantopus), 133, 136
 hypericana (Lathronympha), 197
 hypericella (Depressaria), 197
 hypocrita (Dasychira), 181
 hypsicles (Papilio), 281
 iapygia (Agapetes, Melanargia), 231, 260, 264
 iarbas (Lymnas), 205
 icarus (Lycaena), 116
 icarus (Polyommatus), 49, 54, 69, 81, 95, 121, 134, 138, 272
 ilia (Apatura), 136
 ilicis (Strymon), 137
 imitaria (Acidalia), 114
 immanata (Cidaria), 134
 immundella (Trifurcula), 41
 impar (Bryophila), 48
 imperialis (Eocles), 194
 imperiosa (Papilio), 281
 impluviata (Hydriomena), 132
 impura (Leucania), 52, 71
 inaequalis (Lyseandra), 79
 incerta (Monima), 172
 incerta (Taeniacampa), 23, 104
 inconspicua (Solenobia), 84
 indica (Vanessa), 181
 ines (Agapetes, Melanargia), 231, 261, 264
 inopella (Aristotelia), 83
 inopiana (Hysterosia), 199
 inornata (Acidalia), 107
 interjectaria (Acidalia), 71
 interrogationis (Plusia), 192
 io (Nymphalis), 3, 50, 69, 95, 130, 137, 155, 184, 228, 252, 257
 io (Vanessa), 54
 iolas (Iolana), 138
 ipsilon (Agrotis), 2
 *irakana (Earias), 239
 iris (Apatura), 136, 174, 220
 irregularis (Dianthaecia), 139
 irrorella (Lithosia), 132
 isolata (Euptychia), 204
 *jacksoni (Dasychira), 180
 jacobaeae (Hypocrita, Euchelia, Tyria), 23, 82, 161, 217, 240, 254
 jahndes (Euthalia), 57
 jahnu (Euthalia), 57
 japygia (Agapetes, Melanargia), *see* iapygia
 jatrophae (Anartia), 203, 276
 jubata (Cleora), 209
 julia (Colaeis), 203, 267, 276
 juncta (Plebejus), 134
 junia (Euptychia), 204
 juniperata (Thera), 82, 158
 jurtina (Maniola), 43, 49, 69, 70, 91, 95, 136, 171
 juvena (Callimormus), 208
 *kamengo (Stracena), 178
 kesava (Euthalia), 56
 knochella (Scythris), 84
 krueperi (Pieris), 101, 103
 kühniella (Ephestia), 7
 lacertinaria (Drepana), 115, 134
 lachesis (Agapetes, Melanargia), 231, 261, 264
 lactearis (Iodis), 82
 ladakensis (Colias), 244
 laertes (Prepona), 202
 lanestris (Eriogaster), 17, 116
 lantanella (Lithocolletis), 119
 lapella (Tinea), 33
 lappona (Erebia), 101, 136
 lapponaria (Nyssia), 104
 larissa (Agapetes, Melanargia), 231
 lathonia (Argynnis), 44, 137, 230
 *latifascia (Pantoporia), 57
 lavatherae (Carcharodus), 138
 lavinia (Precis), 276
 leander (Coenonympha), 136
 lentiginosella (Gelechia), 199
 lepida (Dianthoecia), 172
 leplastriana (Laspeyresia), 84
 leporina (Acronycta), 107
 lesbia (Colias), 75, 194
 leuce (Terias), 206, 274
 leucographa (Pachnobia), 105
 leucomelas (Agapetes, Melanargia), 235, 260
 leucostigma (Helotropha), 135
 libatrix (Scoliopteryx), 199, 238
 libye (Euptychia), 204
 libythea (Appias), 70
 lichenaria (Cleora), 82
 ligca (Erebia), 102, 136
 ligula (Cerastis), 80
 ligustri (Acronycta), 107
 ligustri (Sphinx), 2, 17, 71, 76, 123
 limbaria (Fidonia), 187
 limbatus (Teracolus), 70
 limoniella (Coleophora), 83
 limoniella (Goniodoma), 83
 linea (Adopoca), 148
 lisa (Terias), 274
 litana (Vacerra), 207
 literata (Diasemia), 141
 litorosa (Miana), 114, 135
 lithargyrea (Leucania), 161
 lithorhiza (Xylocampa), 117
 littoralis (Leucania), 105, 133
 littoralis (Sericoris), 141
 livornica (Celerio), 5, 122, 230
 logiana (Peronea), 198
 loniceræ (Zygaena), 186
 lubricipeda (Diaeris), 48
 lubricipeda (Spilosoma), 51
 lucerne (Agrotis), 157
 lucilla (Neptis), 137

- lucina (Hamearis), 69
 lucipara (Euplexia), 52
 luctuosa (Eustrotia), 32, 48
 luculella (Telphusa), 33
 lunaris (Chirocompa), 33
 lunigera (Agrotis), 17, 132, 134
 lunosa (Omphaloscelis), 2
 lupulinus (Hepialus), 80
 lurideola (Lithosia), 80, 133, 194, 212
 lutea (Diacrisia), 48
 luteolata (Opisthograptis), 192
 lutescens (Callimorpha), 218
 lutosa (Calamia), 2, 23
 lutosa (Leucania), 158
 lutulenta (Aporophyla), 158
 lycaon (Maniola), 136
 lychnidis (Amathes), 2
 machaon (Papilio), 103, 135, 168, 220
 macilenta (Amathes), 158
 macularia (Pseudopanthera), 122
 macularia (Venilia), 80
 maculata (Venilia), 221
 maculiferella (Phthorimaea), 33
 maculipennis (Plutella), 5, 155, 185, 229
 *madelineae (Pachypasa), 160
 maerula (Amynthia), 206
 maia (Argynnis), 137
 major (Pyrgus), 138
 malvae (Hesperia, Syrichtus), 220
 malvae (Pyrgus, Syrichtus), 106, 139
 manni (Pieris), 103, 216
 manto (Erebia), 233, 264
 marginaria (Erannis, Hibernia), 71
 marginata (Lomaspilus), 82
 marginea (Lischeria), 33
 marginepunctata (Acidalia), 143
 maritima (Bucculatrix), 45
 maritima (Senta), 123, 133
 marsyas (Pseudolycaena), 206
 martini (Euploea), 220
 maura (Mania), 12
 medusa (Erebia), 101, 136
 megera (Pararge), 70, 95, 136
 meleager (Polyommatus), 138
 meliloti (Zygaena), 272
 melpomene (Heliconius), 203
 memnon (Papilio), 281
 mendica (Argyresthia), 71
 menthastri (Spilosoma), 51
 menyanthidis (Acronycta), 272
 meris (Lasaia), 205
 mesoleucum (Nymphidium), 205
 mesomella (Lithosia), 132
 messaniella (Lithocolletis), 117
 meticulosa (Phlogophora), 2
 metis (Apatura), 136
 mi (Euclidia), 93, 161
 miniosa (Taeniacampa), 104, 187
 miniosaria (Enconista), 82
 *minor (Anaea), 277
 minor (Caligo), 204
 minor (Lysandra), 121
 minorata (Perizoma), 135
 misella (Tinea), 84
 misippus (Hypolimnas), 277
 mnemosyne (Parnassius), 103
 moeschleri (Pyrgus), 138
 monacha (Lymantria), 133, 244
 monoglypha (Xylophasia), 51, 71, 107
 *monomorpha (Appias), 275
 montana (Euthalia), 56
 montanata (Xanthorhoe), 52
 monuste (Pieris), 206, 275
 mouffetella (Epithectis), 33
 *mounseyi (Pyrameis), 112
 munda (Monima, Taeniacampa), 71, 104
 muralis (Bryophila), 114, 198
 muscosa (Dasychira), 181
 mylitta (Dynamine), 203
 myllerana (Choreutis), 199
 myncea (Euptychia), 204
 myopiformis (Ageria, Sesia), 33, 60
 myrmidone (Colias), 102, 136
 myrtillata (Gnophos), 72, 135
 myrtilli (Anarta), 133
 naevolus (Cydrus), 207
 nana (Dianthoea), 48
 nana (Harmodia), 197
 nanata (Epithectis), 82
 napi (Pieris), 50, 55, 61, 69, 70, 95, 103, 175, 182, 225, 266
 nebulella (Homocosoma), 83
 neglectana (Gypsonoma), 84
 neophanes (Myelois), 48, 223, 267
 nerii (Deilephila), 5
 nervosa (Depressaria), 83
 neustria (Malacosoma, Bombyx), 71, 82, 91, 133, 209
 ni (Plusia), 230
 nigra (Aporophyla), 158
 nigricans (Agrotis), 171
 nigrina (Limenitis), 33, 120
 nigrocincta (Polia), 24
 nigricomella (Bucculatrix), 83
 nigrosericeata (Chlorocystis), 32
 niobe (Argynnis), 70, 73, 137
 nise (Terias), 206
 noctuella (Nomophila), 4, 156, 182, 229, 258
 nocturnata (Chiasmia), 24
 nocturnata (Semiothisa), 199
 *nomus (Papilio), 281
 notata (Semiothisa), 107
 notha (Brepheos), 220
 nubeculosa (Asteroscopus), 278
 nubes (Calycopis), 206
 nubilalis (Pyrausta), 185
 nubila (Zeuzera), 75
 nupta (Catocala), 32, 45, 291
 nyctelius (Prenes), 207
 nymphaeata (Hydrocampa), 210
 obelisa (Agrotis), 157
 obeliscata (Thera), 82, 244

- obliquaria (Chesias), 187
 oblongata (Eupithecia), 267
 obscurata (Gnophos), 114, 134
 obsitalis (Hypena), 264, 290
 obsoleta (Lysandra), 79
 obsoleta (Xanthia), 267
 obsoletella (Phthorimaea), 198
 obstipata (Phibalapteryx), 290
 occulata (Aplecta), 267
 ocellana (Spilonota), 144
 ocellaris (Mellinia), 23, 122, 148
 ocellata (Larentia), 94
 ocellatus (Smerinthus), 187, 192, 199
 ochraceella (Mompha), 33
 ocola (Prenes), 207
 octogessima (Palimpsestis), 32, 107
 octomaculata (Eudamus), 207
 octomaculata (Pyrausta), 197
 odius (Aganisthos), 203
 oeme (Erebia), 101
 oleracea (Mamestra), 51
 ononaria (Aplasta), 107, 194
 ononidis (Parectopa), 84
 operculella (Phthorimaea), 23
 or (Palimpsestis), 132
 orbifer (Spialia), 138
 orientalis (Anthocharis), 102
 orientalis (Erebia), 101, 136
 orientalis (Euchloë), 103
 orilus (Papilio), 75
 orion (Diptera), 106
 orion (Scolitantides), 138
 ornata (Acidalia), 135
 osiris (Paraproctis), 179
 oregiata (Lampropteryx), 245
 oxyacanthae (Meganephria), 71
 oxyacanthae (Miselia), 53, 82
 padellus (Hyponomeuta), 83, 269
 palaemon (Carterocephalus), 102, 139
 palealis (Loxostege), 16, 267
 palegon (Calycopis), 205
 pales (Argynnis), 101, 137
 pallescentella (Tinea), 33
 pallida (Colias), 3
 palmyra (Terias), 275
 palpina (Pterostoma), 106, 107
 pamphilus (Coenonympha), 49, 121, 136
 pandora (Argynnis), 137
 paphia (Argynnis), 34, 55, 70, 95, 120, 132, 137, 173, 215
 papilionaria (Geometra), 115
 parasitella (Tinea), 84
 parmatana (Eucosma), 217
 parthenias (Brepheos), 105, 124
 patna (Elymnias), 57
 pavonia (Saturnia), 51, 71, 142, 156, 172
 peleus (Megalura), 274
 pellucida (Ithomia), 203
 pendularia (Cosymbia), 82
 pennaria (Himera), 159
 pericles (Cymaenes), 208
 perla (Bryophila), 134
 persica (Polymmatas), 95
 persicariae (Melanchra), 82
 peterburgensis (Arctia), 75
 phareus (Mesene), 205
 pherusa (Agapetes, Melanargia), 231
 phlaeas (Lycaena), 50, 54, 81, 95, 138, 221
 phlegyas (Zemerus), 58
 phloeas (Chrysophanus), 91
 phoebe (Melitaea), 137
 phorcys (Erebia), 103, 136
 phragmitellus (Chilo), 92
 phragmitidis (Calamia, Leucania), 123, 133
 phylaeus (Hylephila), 278
 phyle (Danaus), 112
 picata (Cidaria), 114
 pictaria (Aleucis), 104
 pigra (Pygaera), 135
 pimpinellata (Eupithecia), 48
 pinastri (Hyloicus, Sphinx), 23, 74, 122, 177
 pinguinella (Gelechia), 118
 pinguis (Euzoptera), 32
 piniaria (Fidonia), 210
 piniperda (Panolis), 104
 pisi (Hadena, Mamestra, Melanchra), 17, 93, 107, 272
 pityocampa (Thaumetopoea), 15
 plagiata (Anaitis), 272
 plantaginis (Parasemia), 51, 132
 plecta (Graphiphora), 242
 plecta (Noctua), 51
 plesaura (Agapetes, Melanargia), 235
 plexippus (Danaus), 5, 36, 42, 94, 143, 202, 226, 230, 259, 274
 plumbana (Lipopterycha), 242
 plumigera (Ptilophora), 159
 podalirius (Papilio, Iphiclides), 8, 84, 103
 podana (Cacoecia), 84
 poeyi (Appias), 275
 polaris (Aglais), 95
 politana (Hemimene), 33
 politis (Calycopis), 206
 polychloros (Nymphalis), 120, 137, 159, 181, 215, 230
 polycommata (Lobophora), 105
 polyctor (Papilio), 282
 polydamas (Papilio), 206, 274
 polyxena (Charaxes), 57
 polyxena (Zerynthia), 102, 103
 popularis (Epineuronion), 143, 157
 populella (Anacamptis, Gelechia), 83, 118
 populeti (Taeniocampa), 104
 populi (Amorpha, Smerinthus), 71, 106, 244
 populi (Limenitis), 137
 populi (Poecilocampa), 82, 159
 populifoliella (Lithocolletis), 83
 porata (Ephyra), 114

- porcellus (*Metopsilus*), 106, 241
 potatoria (*Cosmotriche*), 114, 133, 220, 267
 praecox (*Agrotis*), 135
 primulae (*Noctua*), 107
 procellata (*Hydriomena*), 32
 procida (*Agapetes*, *Melanargia*), 234, 260, 264
 prodromaria (*Biston*), 71
 progne (*Emesis*), 205
 promissa (*Catocala*), 133
 pronos (*Erebia*), 233, 264
 pronuba (*Triphaena*), 72, 140, 162, 229
 pronubana (*Cacoecia*), 33
 proserpina (*Aulocera*), 136
 proteides (*Eudamus*), 277
 proteus (*Eudamus*), 207, 277
 pruni (*Strymon*), 69, 138
 psi (*Acronycta*), 17, 188
 psittacata (*Geometra*), 82
 pterodactylus (*Pterophorus*), 140
 pudibunda (*Dasychira*), 162
 pulchella (*Deiopeia*, *Utethesia*), 44, 122
 *pullus (*Zemeros*), 58
 pulverulenta (*Monima*), 71
 punctaria (*Cosymbia*), 82
 *punctata (*Heliconius*), 276
 punctinalis (*Boarmia*), 23, 172
 purpuralis (*Zygaena*), 24, 272
 pusaria (*Cabera*), 82
 pustulata (*Comibaena*), 124
 pygmaeana (*Acrolepia*), 83, 116
 pyramidea (*Amphipyra*), 80, 209
 quadra (*Oenestis*, *Lithosia*), 106, 133, 282, 292
 quadripunctaria (*Callimorpha*), 23, 171, 267
 quercifolia (*Gastropacha*), 82, 123
 quercus (*Lasiocampa*), 71, 143, 172
 quercus (*Thecla*), 14, 70, 106, 138
 quercus (*Philyrus*), 80
 radiata (*Lycæna*), 95
 rapae (*Pieris*), 1, 50, 69, 95, 103, 115, 168, 172, 182, 216, 226, 259
 rectangulata (*Chloroclystis*), 32, 220
 reducta (*Limenitis*), 137
 repandata (*Boarmia*), 72, 209
 retractus (*Eudamus*), 278
 revayana (*Sarothrips*), 48, 80, 114
 rhamnata (*Philereme*), 23
 rhamni (*Gonepteryx*), 14, 43, 54, 69, 85, 95, 111, 130, 154
 rhododactyla (*Platypilia*), 116
 rhodopensis (*Coenonympha*), 136
 rhodopensis (*Erebia*), 103
 rhomboidaria (*Boarmia*), 189, 194
 ridens (*Polyplocia*), 105, 106
 ripae (*Agrotis*), 133, 143, 220
 rivularis (*Neptis*), 137
 roboraria (*Boarmia*), 107
 rorella (*Hyponomenta*), 217, 269
 rosana (*Cacoecia*), 84
 rossii (*Pieris*), 103
 rostralis (*Hypena*), 265
 roystonensis (*Lysandra*), 122
 roxelana (*Pararge*), 136
 rubi (*Bombyx*), 117
 rubi (*Callophrys*), 69, 80, 137
 rubi (*Macrothylacia*), 220
 rubidata (*Anticlea*), 17, 114
 rubiginata (*Acidalia*), 106
 rubiginosa (*Orrhodia*), 104, 158
 rubricosa (*Pachnobia*), 104
 rufana (*Encosma*), 217
 rufata (*Eucestia*), 187
 rufescens (*Brachmia*), 33
 ruficornis (*Drymonia*), 83
 rumicis (*Acronycta*), 17, 51, 143, 272
 ruptilinea (*Dasychira*), 181
 rurea (*Xylophasia*), 272
 rutilus (*Lycæna*), 102, 138
 sabulifera (*Cosmophila*), 169, 171
 sacraria (*Rhodometra*), 122
 salicis (*Stilpnotia*, *Leucoma*, *Liparis*), 71, 82, 91
 saligna (*Phycroctistis*), 220
 salinella (*Coleophora*), 83
 sambucalis (*Phlyctænia*), 33
 sambucaria (*Ourapteryx*), 32
 sambulana (*Pyraustis*), 112
 sangala (*Calycopis*), 205
 sanio (*Diacrisia*), 17
 santiago (*Eudamus*), 278
 satura (*Hadena*), 131
 satyrata (*Eupithæcia*), 52
 saucia (*Agrotis*), 2, 17
 scabriuscula (*Dipterygia*), 243
 schrankella (*Morpho*), 199
 scotica (*Coenonympha*), 134
 scotica (*Eumenis*), 135
 scrophulariae (*Cucullia*), 82
 sebrus (*Cupido*), 138
 secalis (*Apamea*), 259
 segetum (*Agrotis*), 158
 selene (*Argynnis*, *Brenthis*), 17, 102, 106, 123, 137, 220, 222
 solenophora (*Pantoporia*), 57
 semele (*Eumenis*), 49, 70, 95, 134, 135, 197
 semiargus (*Cyaniris*), 138
 semibrunnea (*Lithophane*), 158
 semifascia (*Gracilaria*), 83
 seminella (*Phthorimaea*), 199
 semisynggrapha (*Lysandra*), 79, 121
 senescens (*Butalis*), 119
 senex (*Nudaria*), 133
 senticetella (*Nothris*), 84
 septembrella (*Nepticula*), 40
 sericealis (*Rivula*), 114
 sesostris (*Papilio*), 75
 *siamensis (*Semanga*), 58
 sibylla (*Limenitis*), 120, 124, 262
 sidae (*Pyrgus*), 138
 significans (*Papilio*), 282
 silius (*Cymaenes*), 208
 simaethis (*Calycopis*, *Thecla*), 206, 277

- similella (Nephoteryx), 240, 292
 similis (Euptychia), 204
 similis (Porthesia), 210
 simplicissima (Mnastheus), 207
 simplicius (Eudamus), 207
 sinapis (Leptidea, Leucophasia), 69, 106, 136, 197
 sinuana (Eucosma), 217
 sinuata (Anticlea), 117, 118
 sinuata (Euphyia), 23
 sinuella (Homoeosoma), 33
 siracusana (Agapetes, Melanargia), 234
 siterata (Chloroclysta), 82
 smaragdaria (Euchloris), 157, 244
 smeathmanniana (Phalonia), 198
 sorbiella (Argyresthia), 144
 sobrinata (Eupithoea), 135
 sociata (Xanthorhoe), 52
 solandriana (Eucosma), 217
 sororcula (Lithosia), 106
 spadicea (Cerastis), 80
 sparsata (Collix), 124
 spartiella (Anarsia), 198
 spini (Strymon), 137
 spiniana (Pammene), 199
 spinicolella (Lithocolletis), 161
 spiniella (Swammerdamia), 141
 sponsana (Peronea), 33
 spurina (Calycopis), 205
 stabilis (Monima, Taeniacampa), 71, 171
 statira (Catopsilia), 206
 stellatarum (Macroglossum), 4, 15, 17, 55, 83, 143, 155, 208, 225, 258
 *stockleyi (Papilio), 282
 straminea (Euxanthia), 198
 straminea (Leucania), 93, 133, 188
 stramineola (Lithosia), 133
 stictica (Elymnias), 57
 stipella (Aristotelia), 33
 strataria (Amphidasys, Biston), 71
 strigula (Agrotis), 17, 51, 72, 114
 strigula (Noctua), 135
 suavella (Eurhodope), 144
 subfulvata (Eupithecia), 32, 114
 subnotata (Eucymatoge), 32
 subtusa (Tethea), 140
 suffumata (Lampropteryx), 245
 suffusella (Aristotelia), 198
 sulphuralis (Emmelia), 106
 sulphuralis (Eustrotia), 48
 sulphurea (Pieris), 61
 sulskowskyi (Morpho), 220
 superba (Semanga), 58
 suspecta (Orthosia), 134
 suwarovius (Agapetes, Melanargia), 260
 syllius (Agapetes, Melanargia), 231, 261, 263, 264
 sylvanus (Ochlodes), 139
 sylvaticella (Coleophora, Eupista), 114
 sylvestris (Adopoea, Thymelicus), 123, 139, 148
 sylvestrana (Retinia), 140
 sylvicola (Prenes), 207, 278
 syngrapha (Lysandra), 77, 122
 syriacana (Earias), 239
 syriothus (Spialia, Hesperia), 207, 278
 syringaria (Pericallia), 80, 142
 syringella (Gracilaria), 83
 taenialis (Hypenodes), 114
 taeniatella (Elachista), 83
 tages (Erynnis), 94, 119, 131, 139, 159, 262
 taraxaci (Caradrina), 52
 tarsipennalis (Aethia), 32
 telamon (Sericinus), 9
 telata (Megistias), 207
 temerata (Bapta), 71
 terrestris (Euptychia), 204
 tersata (Eucymatoge), 32
 testacea (Apamea), 157
 testacea (Palluperina), 71
 testata (Lygris), 135
 thaumas (Adopoea), 23, 148
 theonus (Lycæna), 277
 thersamon (Lycæna), 138
 theseus (Dynamine), 203
 thyamus (Papilio), 274
 thysbe (Delias), 56
 tiliae (Mimas, Smerinthus), 123, 187, 191, 216, 244, 267
 tincta (Aplecta), 105
 tipuliformis (Sesia), 80, 266
 tithonus (Maniola), 70, 120, 135
 tityrus (Lycæna), 138
 torrana (Lipopterycha), 242
 trabealis (Emmelia), 106
 trabealis (Eustrotia), 48
 transversata (Philereme), 23, 124
 trapezana (Eucosma), 217
 tremula (Pheosia), 23, 107
 trepida (Notodonta), 105, 106, 123
 trifolii (Hadena), 71
 trifolii (Lasiocampa, Bombyx), 17, 135, 143
 trifolii (Mamestra), 133
 trifolii (Zygaena), 122, 123, 272
 trimacula (Drymonia), 106, 107
 trimaculana (Eucosma), 197
 trimaculella (Nepticula), 40
 tripartita (Abrostola), 52
 tripuncta (Lerodea), 207
 triplasia (Abrostola), 132
 tristata (Eppirrhoe), 272
 tristellus (Crambus), 33
 trite (Catopsilia), 276
 tritici (Agrotis), 135, 143, 148
 trivia (Melitaea), 137
 troglodyta (Anaea), 274
 truncata (Dysstroma), 24
 tullia (Coenonympha), 120, 134
 tullius (Perophtalma), 204
 turca (Leucania), 224
 turcica (Agapetes, Melanargia), 261
 typica (Mania), 188
 ulicis (Enargia), 224
 umbra (Chariclea), 80

- umbra (Pyrrhia), 17, 132, 143, 177, 266
 umbricolora (Dasychira), 181
 umbrosa (Noctua), 134
 undulata (Calocalpe), 23
 undulata (Scotosia), 91
 unipuncta (Leucania), 155
 unitella (Borkhausenia), 33
 uraneis (Morpho), 76
 urticae (Abrostola), 141
 urticae (Aglais), 2, 35, 49, 54, 69, 70, 94, 95, 122, 130, 137, 155, 168, 184, 222, 241, 252, 255, 263, 266
 urticae (Spilosoma), 123
 urticae (Vanessa), 116, 228
 vacciniella (Lithocolletis), 118
 vaccinii (Conistra, Orrhodia), 71, 158
 valesina (Argynnis), 34, 120, 174, 215
 vanillae (Dione), 203, 276
 variata (Thera), 72, 82, 210
 vectisana (Phalonia), 199
 variegana (Peronca), 33
 vaulogeri (Dyspresta), 75
 veloda (Epeus), 208
 velutina (Taygetes), 204
 venata (Ochlodes), 123, 139
 venezulae (Mysoria), 206
 venosata (Eupithecia), 48, 197
 venusta (Terias), 206
 venustula (Erastria), 220, 244
 verbascella (Nothris), 209
 versicolor (Endromis), 71, 105, 135
 verticalis (Loxostege), 33
 vespiformis (Aegeria, Synanthedon), 267
 vestigialis (Agrotis), 133, 143
 vetulata (Philerme), 124
 vetusta (Calocampa), 158
 vibex (Thymelicus), 207
 vierama (Philotes), 138
 vigintipunctata (Yponomeuta), 244
 villica (Arctia), 17, 161
 villosella (Pachythelia), 267
 vinula (Cerura, Dieranura), 71, 83, 184, 266
 virgaureae (Lycæna), 138
 virgaureata (Eupithecia), 210
 virgilius (Theope), 205
 virginia (Pieris), 275
 virgularia (Acidalia), 71
 viridata (Nemoria), 17
 vitellina (Leucania), 5, 158, 259
 vittata (Phibalapteryx), 80
 vixinga (Aphnaeus, Spindasis), 56, 59
 wailesella (Leucoptera), 199
 w-album (Strymon, Thecla), 31, 84, 121, 171, 197
 *walteri (Papilio), 281
 *warneri (Colacnis), 276
 warrioris (Cleophana), 75
 wauaria (Halia), 80
 westwoodii (Terias), 206
 woehreriana (Laspeyresia), 33
 wolfsbergeri (Euphydryas), 47
 xanthographa (Noctua), 71, 134
 xanthomelas (Nymphalis), 137
 xanthomista (Polia), 143, 157
 xarifa (Lymnas), 205
 ypsilon (Agrotis), 17, 158, 188
 zalmoxis (Papilio), 220
 zapateri (Erebia), 264
 zephirus (Plebejus), 138
 zestos (Epargyreus), 278
 ziezac (Notodonta), 83, 118
 zoegana (Euxanthia), 33
 zonaria (Nyssia), 105
 zophodactyla (Stenoptilia), 117

Order XXII. COLEOPTERA.

- anophthalma (Langolandia), 194
 asparagi (Cricocoris), 220, 243
 biguttatus (Tomoxia), 220
 bipunctata (Coccinella), 172
 boleti (Cis), 209
 boleti (Scardia), 220
 campanulae (Miarus), 23
 caraboides (Melandrya), 220
 cerambyciformis (Leptura), 220
 coeruleus (Helops), 171
 coriarius (Prionus), 48
 decim-punctata (Coccinella), 172
 delitescens (Aspidomorpha), 220
 dicksoni (Helichus), 165
 *Dryopomorphus, 165
 equestris (Cassida), 23
 extraneus (Dryopomorphus), 166
 flavicornis (Dorcatoma), 23
 *gressitti (Helichus), 164
 hederæ (Cissophagus), 171
 hemisphaerica (Cassida), 48
 leucophthalmus (Sphodrus), 171
 limnoides (Heterelmis), 288
 livida (Leptura), 70
 loti (Apion), 23
 megatoma (Attagenus), 23
 melanura (Strangalia), 70
 menthastri (Chrysomela), 70
 menthrasti (Chrysomela), 70
 monticolor (Lesteva), 244
 nitens (Attelabus), 244
 noctis (Gymnetron), 23
 obscura (Heterelmis), 289
 omphalia (Pseudomes), 267
 parallelocolis (Rhizophagus), 172
 pelli (Attagenus), 23
 piceus (Attagenus), 124
 plana (Heterelmis), 289
 pleurostigma (Ceuthorrhynchus), 23
 polita (Chrysomela), 70
 *pubipes (Heterelmis), 285
 quadripunctata (Clythra), 220

rubiginosa (Cassida), 267
 rufo-marginata (Heterelmis), 288
 ryei (Apion), 244
 *salti (Elsianus), 283
 scrophulariae (Cionus), 244
 spiniger (Geotrupes), 220
 subfuscus (Athoris), 244

testaceus (Claviger), 76
 trifasciata (Attagenus), 124
 trifasciatus (Attagenus), 23
 typhaeus (Geotrupes), 220
 viridis (Cassida), 23
 vittata (Cassida), 48

Order XXIII. DIPTERA.

aerosus (Gymnopternus), 96
 agilis (Tachydromia), 19
 albimanus (Platychirus), 19
 albipennis (Dilophus), 96
 alboguttata (Amiota), 218, 224
 annulipes (Sympycnus), 96
 arrogans (Tachista), 19
 articulata (Tachydromia), 220
 atricornis (Phytomyza), 22
 atroparvus (Anopheles), 243
 bipunctatus (Chrysonotus), 96
 bombylans (Volucella), 242
 calcitrans (Stomoxys), 19
 campestris (Rhynghia), 19
 canicularis (Fannia), 19
 carbonaria (Sciara), 95
 caudata (Sciara), 95
 chalybeata (Beris), 96
 Cheilotrichia, 243
 cinctellus (Syrphus), 19
 cinerea (Chortophila), 48
 clypeatus (Platychirus), 19
 confusus (Pipunculus), 19
 Dasymolophilus, 243
 domestica (Musca), 19
 elutus (Anopheles), 243
 Empeda, 243
 ephippium (Calobata), 96
 equinus (Borborus), 19
 Erioptera, 243
 fasciata (Amaurosoma), 19
 febrilis (Dilophus), 18
 fenestralis (Anisopus), 19
 flava (Coelosia), 292
 flava (Gonempeda), 243
 flavicornis (Microchrysa), 19
 fraterna (Chilosia), 96
 fulcata (Orellia), 24, 194
 fuscipennis (Erioptera), 219
 geniculatus (Borborus), 19
 geniculata (Bucentes), 96
 glaucius (Ischyrosyrphus), 19
 gramineus (Chrysotus), 96
 heraclei (Acidia), 19
 hyalipennis (Sciara), 95
 ibis (Atherix), 19
 Ilisia, 243
 johannis (Bibio), 19
 lateralis (Phytomyza), 22
 latifasciatus (Syrphus), 96
 longipennis (Sapromyza), 96
 longirostris (Myopites), 48
 loripes (Campsicnemus), 96

lucorum (Leucozona), 96
 lurida (Hilara), 219
 lutescens (Chionea), 74
 maculata (Acyphona, Ilisia), 218
 maculata (Chilosia), 19
 maculipennis (Anopheles), 242
 major (Tachydromia), 220
 manicatus (Platychirus), 19
 marci (Bibio), 19
 maxima (Tipula), 96
 melampodia (Ilisia), 219
 messeae (Anopheles), 243
 metallina (Liogaster), 19
 minuta (Tachydromia), 19
 Molophilus, 243
 morata (Hilara), 219
 morsitans (Simulium), 18
 myopinus (Centor), 19
 nigripennis (Hercostomus), 96
 nigriventris (Bibio), 96
 notata (Scatopse), 95
 nubila (Tachypeza), 96
 obscuripes (Ilisia), 219
 *occoecata (Ilisia), 219
 Ormosia, 243
 paleata (Trypeta), 24, 194
 pallida (Forcipomyia), 192
 paludis (Pterobosca), 150, 244
 peltatus (Platychirus), 19
 pilosa (Verrallia), 96
 platypterus (Sciaphus), 96
 plumata (Volucella), 242
 plumbeus (Anopheles), 96
 plumipes (Dolichopus), 19
 popularis (Dolichopus), 96
 primus (Triglyphus), 48
 pseudogiraudi (Megaselina), 219
 Psiloconopa, 243
 pulicaris (Culicoides), 19
 punctatus (Anisopus), 19
 punctulata (Tetanocera), 19
 quadrifasciata (Spilomyia), 290
 Rhypholophus, 243
 riedeli (Erioptera), 219
 rorida (Sapromyza), 19
 rudis (Pollenia), 19
 rufa (Psila), 19
 Sciara, 243
 scolopacea (Leptis), 96
 selenitica (Scaeva), 5
 spinimana (Norellia), 19
 stercorea (Empis), 19
 Styngomyia, 243

Symplecta, 243
 tarsalis (Conicera), 219
 Tasiocera, 243
 thomae (Sciara), 95
 Trimicra, 243
 tringaria (Leptis), 96

trigramma (Empis), 19
 trimacula (Palloptera), 19
 vespertina (Tephrites), 96
 vicina (Ilisia), 219
 vitripennis (Syrphus), 96
 zoë (Spilographa, Trypeta), 22

Order XXVI. HYMENOPTERA.

abjectus (Apanteles), 83, 142
 adunca (Microplitis), 188
 adjunctus (Apanteles), 117
 affinis (Apanteles), 83, 115
 alvearia (Microplitis), 187
 analis (Apanteles), 93
 Apanteles, 39
 ardeapenellae (Apanteles), 83
 astrarches (Apanteles), 81, 142
 ater (Apanteles), 82
 aterrima (Phymatocera), 31
 atomella (Trigona), 17
 Atopodon, 109
 atratus (Cephalotes), 48
 austriaca (Vespa), 20
 berwicki (Rhizomyrma), 110
 bicolor (Apanteles), 161
 bicolor (Osmia), 267
 bruchi (Rhizomyrma), 110
 bignelli (Apanteles), 93
 bignellii (Apanteles), 47
 blancardellae (Apanteles), 83
 bombycivorus (Ophion), 292
 borealis (Microplitis), 189
 brunnicornis (Herpestomus), 270
 butalidis (Apanteles), 83, 119
 caberae (Apanteles), 82
 cajae (Apanteles), 116
 calceatus (Microgaster), 210
 callidus (Apanteles), 162
 carbonarius (Apanteles), 83, 91
 centuncularis (Megachile), 18
 chrysostictus (Apanteles), 141
 cleoceridis (Apanteles), 116
 complanatus (Apanteles), 83
 congestus (Apanteles), 93
 coniferae (Apanteles), 140
 connexus (Microgaster), 210
 contaminatus (Apanteles), 118
 corvinus (Apanteles), 83, 141
 crassicornis (Microgaster), 212
 crinsacri (Mymar), 94
 cr. jatus (Apanteles), 4
 cultrator (Apanteles), 118
 cupreus (Apanteles), 81
 decedens (Rhizomyrma), 110
 decorus (Apanteles), 118, 140
 difficilis (Apanteles), 117
 dilectus (Apanteles), 83, 118
 dolens (Microplitis), 188
 dubita (Rhizomyrma), 110
 emarginatus (Apanteles), 83, 119
 ensiformis (Apanteles), 83
 eremita (Microplitis), 188

erythronotus (Acoclius), 40
 euphorbiae (Apanteles), 83
 euphorion (Entedon), 244
 evonymella (Apanteles), 83
 exilis (Apanteles), 119
 oxsanguis (Rhizomyrma), 110
 facialis (Mesochoerus), 14
 falcatus (Apanteles), 117
 femoralis (Apanteles), 82
 femorata (Cimbex), 168
 ferrugineus (Apanteles), 92
 flavilabris (Apanteles), 84
 flavipes (Microgaster), 209
 flavolimbatus (Apanteles), 83
 formosus (Apanteles), 161
 fraternus (Apanteles), 161
 fuhrmanni (Rhizomyrma), 110
 fuliginosus (Apanteles), 141
 fulvipes (Apanteles), 162
 fumipennis (Microplitis), 187
 fusca (Formica), 76
 gabrielis (Apanteles), 83
 gastropachae (Apanteles), 82
 germanica (Vespa), 20
 geryonis (Apanteles), 115
 globatus (Microgaster), 39, 211
 glomeratus (Apanteles), 39, 115
 göldii (Rhizomyrma), 110
 Gronoceras, 37
 halidaii (Apanteles), 83
 hiberniae (Apanteles), 82
 hispalensis (Microplitis), 188
 hoplites (Apanteles), 83, 117
 hospes (Microgaster), 212
 hyerana (Hastula), 187
 immunis (Apanteles), 142
 impavidus (Apanteles), 82
 impurus (Apanteles), 84, 140
 inclusus (Apanteles), 142
 infelix (Comys, Encyrtus), 47
 infrapicta (Osmia), 38
 insidens (Apanteles), 82
 instabilis (Pezomachus), 92, 162
 intrapicta (Osmia), 38
 fucundus (Apanteles), 116
 fugosus (Apanteles), 82
 juniperatae (Apanteles), 82, 116
 lacteus (Apanteles), 83
 laetus (Apanteles), 83
 lateralis (Apanteles), 82, 162
 lautellus (Apanteles), 161
 lenticularis (Neuroterus), 25
 lictorius (Apanteles), 84, 117
 limbatus (Apanteles), 115

- lincipes (Apanteles), 140
 lineola (Apanteles), 84
 liparidis (Apanteles), 82
 longicauda (Apanteles), 83
 longicaudis (Apanteles), 141
 longipalpis (Apanteles), 119
 lugens (Apanteles), 24
 macula (Thrinax), 25
 maculipes (Sagaritis), 117
 majalis (Angitia), 270
 Malacomyrma, 109
 marginatus (Microgaster), 210
 marshalli (Rhizomyrma), 110
 mediana (Microplitis), 188
 mediator (Microplitis), 188
 Megachile, 37
 melanoscelus (Apanteles), 82
 merula (Apanteles), 142
 mesoxanthus (Apanteles), 83
 Microgaster, 39
 Microplitis, 39
 minutus (Microgaster), 209
 mixta (Thrinax), 25
 muscorum (Bombus), 86
 nanus (Apanteles), 83, 119
 natalensis (Osmia), 37
 *neavei (Osmia), 37
 nigripes (Apanteles), 83
 nobilis (Microgaster), 212
 nothus (Apanteles), 117
 novicius (Microgaster), 211
 obscurus (Apanteles), 83, 142
 ocellatae (Microplitis), 187
 ochneriae (Apanteles), 82
 ochrostigma (Apanteles), 84
 octonarius (Apanteles), 142
 olerum (Mesochorus), 94
 ononidis (Apanteles), 83
 ordinarius (Apanteles), 92
 pachycera (Rhizomyrma), 110
 pallidipes (Apanteles), 161
 pallidipes (Sigalphus), 140
 parallelus (Apanteles), 82
 paramaribensis (Rhizomyrma), 110
 parasitellae (Apanteles), 84
 parvidens (Rhizomyrma), 110
 pectoralis (Mesochorus), 187
 phalaenarum (Prophanurus), 94
 pickeli (Rhizomyrma), 110
 pictilis (Apanteles), 161
 Phymatocera, 26
 picipes (Apanteles), 83
 pinicola (Apanteles), 82
 placidus (Apanteles), 117
 *pluto (Microgaster), 211
 politus (Microgaster), 212
 popularis (Apanteles), 82, 161
 posticus (Microgaster), 209
 praepotens (Apanteles), 82
 praetor (Apanteles), 84, 119
 punctiger (Apanteles), 117
 Rhizomyrma, 109
 *robae (Acropyga, Rhizomyrma), 108
 rubecula (Apanteles), 115
 rubripes (Apanteles), 115
 rufa (Formica), 40
 rufa (Vespa), 20
 ruficornus (Apanteles), 92
 rugulosus (Microgaster), 39, 210
 ruricola (Microplitis), 187
 russatus (Microgaster), 210
 rutgersi (Rhizomyrma), 110
 salebrosus (Apanteles), 82, 91
 scabriculus (Apanteles), 117
 scapularis (Apanteles), 82
 scoticus (Microgaster), 210
 scrophulariae (Apanteles), 82
 sericeus (Apanteles), 115
 sicarius (Apanteles), 141
 smithi (Rhizomyrma), 110
 smithianus (Bombus), 86
 sodalis (Apanteles), 84, 140
 solitarius (Apanteles), 91
 sordipes (Microplitis), 188
 spartii (Mirax), 40
 spectabilis (Microplitis), 188
 spinolae (Microplitis), 187
 spretus (Microgaster), 212
 spurius (Apanteles), 116
 stauropodis (Apanteles), 142
 stellatarum (Apanteles), 83
 sticticus (Microgaster), 211
 strenua (Microplitis), 188
 striatulus (Heriadopsis), 38
 subcompletus (Microgaster), 211
 subfasciatus (Acodelius), 40
 suevus (Apanteles), 118
 suffolciensis (Microgaster), 187, 209
 sylvestris (Vespa), 48
 tenebrosus (Apanteles), 140, 209
 stauropodis (Apanteles), 142
 tenebrosus (Apanteles), 140, 209
 tetricus (Apanteles), 91
 Thrinax, 26
 tibialis (Microgaster), 212
 tiro (Microgaster), 210
 triangulator (Apanteles), 161
 Trichiosoma, 26
 tristis (Microplitis), 188
 tuberculifera (Microplitis), 189
 ultor (Apanteles), 117
 umbellatarum (Apanteles), 117
 vanessae (Apanteles), 117
 viator (Acroplitis), 117
 vidua (Microplitis), 187
 viminetorum (Apanteles), 117
 vipio (Apanteles), 84
 vitripennis (Apanteles), 82, 162
 vulgaris (Vespa), 20
 vulgaris (Linaria), 116
 wesmaeli (Microgaster), 209
 westwoodi (Stenamma), 76
 wheeleri (Rhizomyrma), 110
 xanthopus (Microplitis), 187
 xanthostigmus (Apanteles), 118
 zygaenarum (Apanteles), 81, 116

ADLARD AND SON, LIMITED,
21, HART STREET, LONDON, W.C. 1.

Indian Agricultural Research Institute (Pusa)
LIBRARY, NEW DELHI-110012

This book can be issued on or before

Return Date	Return Date